

The **MINING CONGRESS JOURNAL**

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The Beginning of Coal Mining

Electric Equipment for Homestake's New Hoist

A Continuous Flow, All Conveyor System

The Modern Electric Cap Lamp as an Aid in Coal Cleaning

Mining Bismuth in Utah

Contributors:

*Dr. John Wellington Finch, Eugene McAuliffe, R. S. Sage, W. B. Fleming,
Borden MacVean and Geo. H. Watson*

**OCTOBER
1935**

The Stored Waters Back of the Nozzle



THE EMPTY NOZZLE means nothing and the pipe line full of water means nothing—it is the accumulated force of the waters in the pressure box back of the nozzle that does the work. Big issues are continually confronting the mining industry and they can only be met successfully through the united effort of all concerned. The majority of all mining enterprise in the country is combined in a strong organization that is constructively fighting the battles of the industry. That organization is the American Mining Congress, and it derives its strength from its members. Every one reaps the benefit of its activity. Give it your support.

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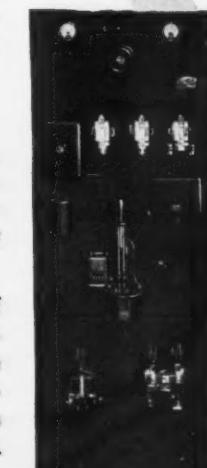
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Full-voltage Semimagnetic Controller

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GENERAL  **ELECTRIC**

OCTOBER, 1935

The MINING CONGRESS JOURNAL

OCTOBER
1935



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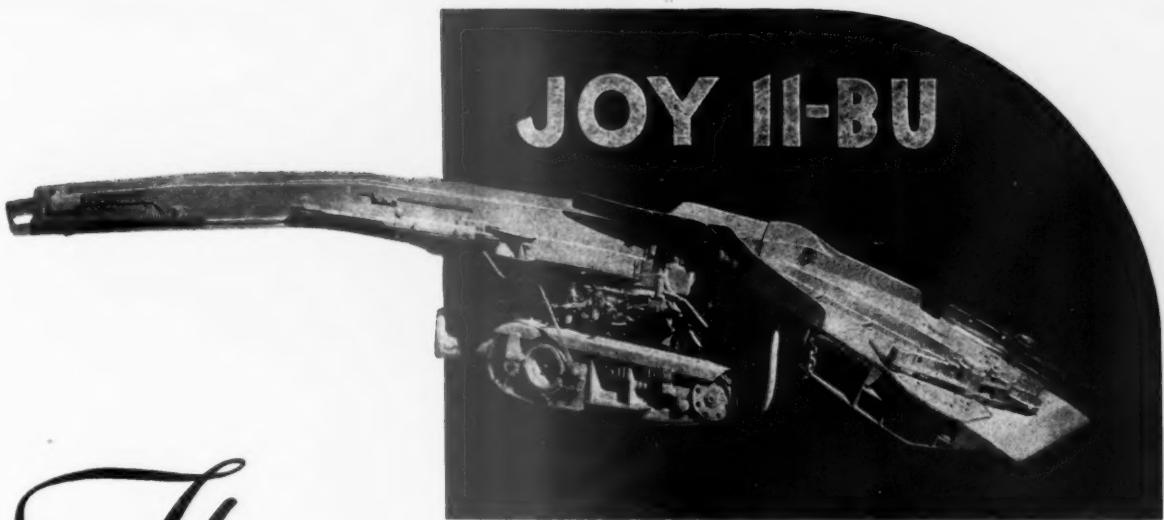
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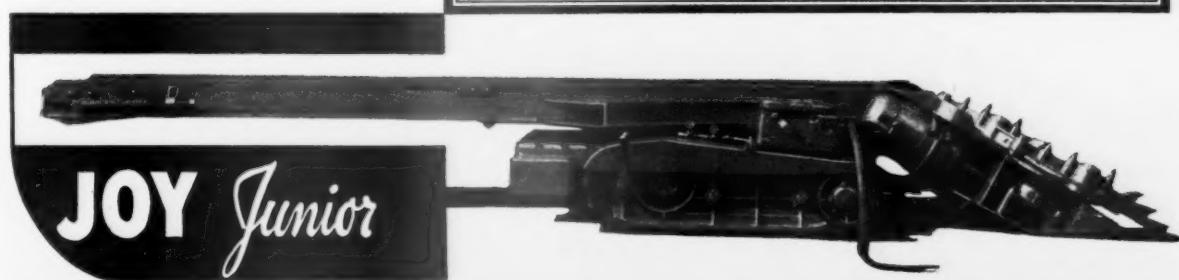
Joy provides a loader most economically fitted to each mining operation from the standpoint of number of crew to potential tonnage output per machine shift.

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COMPARISON OF DIFFERENT TYPES OF JOY LOADERS

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Rated capacity—tons per minute.....	½	1½	2	2	4
Maximum capacity—tons per minute.....	1	2½	3½	3½	6½
Total weight of loader.....	7000	9500	14500	15600	19000
Total height of loader.....	26"	35"	40"	53"	54" 48"
Total width of loader.....	4'4"	4'6"	6'0"	6'0"	7'0" 7'0"
Total length of loader.....	17'9"	20'5"	23'9"	24'6"	25'0" 25'0"
Speeds caterpillar low ft/min.....	20	55	37	37	54 54
Speeds caterpillar high ft/min.....	60	170	114	114	178 178
Speeds front conveyor ft/min.....	127	167	175	191	212 228
Speeds rear conveyor ft/min.....				258	223
Speeds gather, arms stroke/min.....	26	42	37	38	36 36
Maximum reach of gather, arms.....	4'10"	5'4"	6'8"	6'8"	7'4" 7'4"
Number of motors used.....	3	1	1	1	1 1
Motor rating.....	2½ ea. *				
	=10 hp	20 hp	35 hp	35 hp	50 hp 50 hp
Crank pin "digging force" lbs.....	3300	4200	5750	5750	7900 7900



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BETHLEHEM 88-80 is a new alloy steel developed just for castings that carry the burden of the grinding and pulverizing involved in concentrating ores. Castings of 88-80 have uniformly high wear-resistance all the way across the surface, all the way through. No soft spots to wear into pockets, no edges so hard as to break or spall off. Every pound of metal is good for a high quota of grinding.

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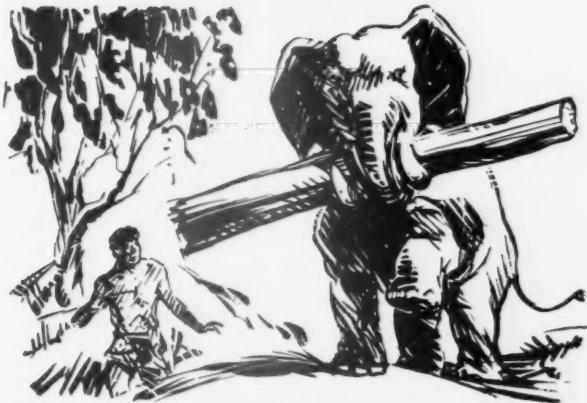
FROGS, Switches, Switch Stands, Guard Rails, Crossings. Every item of equipment for track in and around mines.

OTHER BETHLEHEM PRODUCTS FOR MINES

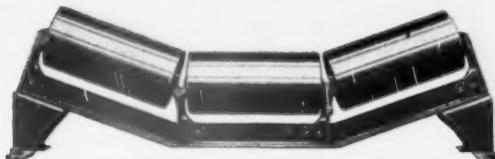
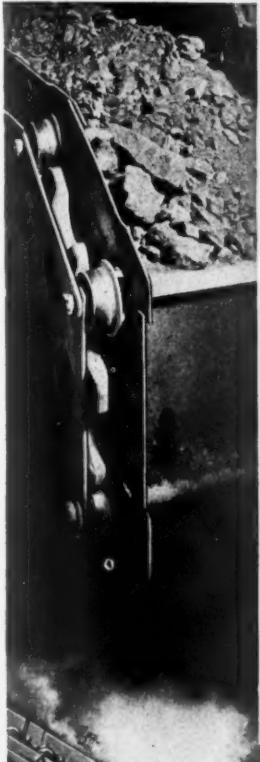
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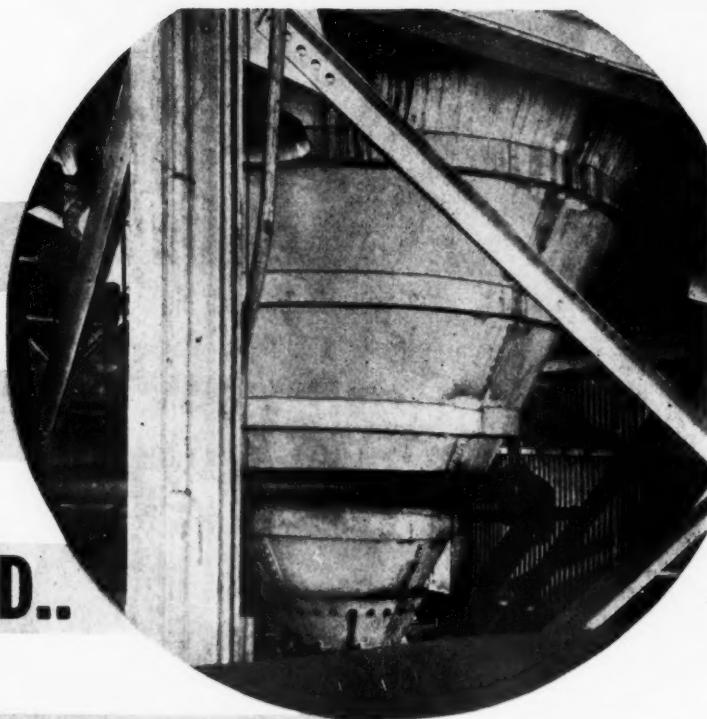


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GREATER DEMAND..

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The Cone, the heart
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The MINING CONGRESS JOURNAL

NUMBER 10
VOLUME 21



OCTOBER
1935

A Journal for the entire mining industry published by The American Mining Congress

A Case in Point



and the population of this area who, down through the years, have mastered the difficult problems of anthracite production and marketing and have builded a staunch, loyal and dependable section of our country. Recent years have brought changes to this happy, thriving district. Economic pressure has caused relentless competition from low labor cost fuels in the natural trade areas of anthracite and many mines are idle and miners without work. Now comes the most disheartening blow. Into Boston and other ports of New England in increasing numbers are coming ships carrying full cargoes of foreign anthracite produced by low-wage labor. Our idle workmen and their needy families are helpless, and the tragedy of the situation lies in the knowledge of our Government that the imports of this foreign anthracite are increasing and that the ships bearing it are coming into the Port of New York as well as into Boston and other New England cities. The present import tax of 10 cents per 100 pounds cannot avail against the Russian anthracite and is not in effect on British and German coal. Little wonder that the anthracite region should request a tax of 25 cents per 100 pounds to give a bare, measured protection to the workmen, and to halt the abandonment of more mines and irrevocable loss of valuable resources of one of our limited national resources.

Ever Increasing Demands



present alarming trend:

"Ultimately taxes must meet all the cost of government. High taxes are the result, not the cause of our troubles. The cause is the ever-increasing demands for more governmental services, Federal, state and local. These demands come mainly from politicians or blocs who buy votes with the taxpayers' money, by claiming credit for public works or for getting something out of the pork barrel. Demands are sometimes made by those who have some selfish interest in more and better Government service. There is little organized resistance to the articulate blocs or groups. Thus, the interest of the taxpayer and the general public in resisting the increases of taxes goes by default. * * * In the two-year period from June, 1933, to June, 1935, our population increased 1 percent, and the number of Federal employees increased 25 percent. * * * The American people are now paying nine and one-half billion dollars a year in taxes. The annual cost of all government,

PRECIOUS heritage of this nation in mineral wealth is the area of high-quality anthracite deposits in eastern Pennsylvania. Precious too are the miners, technicians, managers

Federal, state and local, rose from three billions in 1913 to seventeen billions in 1934. In 1913 taxes required a contribution of \$1 for every \$15.50 of our national income; now the load is about \$1 for every \$3 of our national income. The total Federal, state and local tax collections for 1932 was eight billions one hundred and forty-seven millions, equivalent to more than one-fifth of the value of all production in the United States, the largest proportion in history."

Industry's Handicap



TO EVERY difficult problem there is a simple solution. Occasionally, however, the solution is so distasteful that it is intentionally overlooked, and in its place comes a complicated, impractical answer.

Stabilization has been an overworked word. It has been discussed at every important meeting of industry for years past. When the National Industrial Recovery Act became a reality, few, if any, felt that it offered a permanent solution. After trial, a few groups in the natural-resource class—notably in the bituminous coal industry—declared its benefits worthy of continuance. The majority in the mining industry felt that their progress had been made in spite of the NRA, and that its so-called benefits failed to offset its handicaps.

Today, industry is faced with its same problem—how to attain stabilization. The anti-trust laws are again in full force, and with all of the discussion and Government experimentation we are still where we always have been. The old law of the survival of the fittest is unchanged.

Robert E. Tally, long an exponent of mineral production stabilization, in a recent address said: "Stabilization signifies nothing more than an adjustment of supply to demand; its aim is to maintain normal inventories and to prevent violent fluctuations in the prices of its products." Admitting the difficulties involved, Mr. Tally says that the "ideal for American business is or should be voluntary regulation or self-government, and it is quite probable that the membership of some industries is even now competent to proceed on this basis. However, the repeal, relaxation or more liberal interpretation of the anti-trust laws, without some positive regulation, might result in such abuse of rights that further and more drastic legislation and regulation would follow. Nevertheless, the mineral industries should strive diligently toward self-regulation, endeavoring to educate and improve the ethics of its membership, and to provide ways and means for such regulation."

The aim is high; the purpose worthy. Certainly mining men will subscribe to the ideal advanced by Mr. Tally, and it is to be hoped will lead the way in the development of sensible, rational stabilization, that will eliminate the cut-throat competition that has so often prevailed.

The Age of Mineral Utilization

By JOHN W. FINCH*

THE present epoch in human history has been variously described as the age of coal, of oil, of iron and steel, of power. Others have called it the age of minerals. All agree, however, that it is a great industrial period.

Power is of course the vital force in the industrial organism. It is applied energy. The latent energy of fuels is useless to man until converted into active energy by combustion. It can then be used through mechanisms and devices that convert it into motion. These are just as indispensable as the energy itself. Such devices and the structures in which they are operated are made of metals and other minerals. The strength of metals is called upon to transmit power through propelling pistons, revolving shafts and gears, and electric transmission lines, to do titanic work beyond the strength of human hands. Thus metals and fuels are intimately interwoven in their industrial uses.

The nonmetallic minerals, too, are of great importance. They insulate and save heat energy, line our furnaces, form our crucibles, encase our spark plugs, form the bulk of industrial and commercial structures, and surface our roads and streets. By themselves they constitute an enormous industry and now create more new wealth each year than the metals and only slightly less than coal or petroleum. * * *

Mineral utilization in our country has brought more human benefit than in any other country, though the transition from an agricultural society to an industrial one came much later than in England, Germany, and other European countries. The United States was settled by intelligent, fearless, and enterprising pioneers. They were heirs to technologic arts, developed in Europe through many centuries, for the utilization of natural resources. Once started, our pioneers were ingenious and tireless in devising and inventing new and better ways of doing things—in mining, milling, smelting, refining, and in manufacturing new and better products. Before the beginning of this century American mineral technology had become preeminent in the world.

The achievements of our mining technologists shaped the destiny of the country. The territory was so large that its permanent unification under a single Government would have been difficult if

* Director, U. S. Bureau of Mines.

The address of Dr. Finch, presented at the recent Metal Mining Convention in Chicago, was a most comprehensive and valuable discussion of the role of minerals in our modern civilization. Highlights of this address are given herewith.

not impossible had it not been for the railroads and telegraph lines that linked its parts together and for the utilization of the supplies of metals needed to build these lines and of the fuel to operate them. This gigantic task was made possible by inventive American engineers and courageous American capital.

The contribution of the mining industry to the railroads did not cease, by the way, with their construction. It has continued to supply the bulk of their traffic reckoned either by tonnage or revenue. In a recent year minerals and their derivatives provided 74 percent of the freight tonnage of railroads and 55 percent of their revenue. * * *

IMPORTANCE OF THE MINERAL INDUSTRY

Since the beginning of the nineteenth century our country has produced more than 1 billion ounces of gold, about 12 billion ounces of silver, 40 billion pounds of zinc, 100 billion pounds of copper, 136 billion pounds of lead. A great part of the country's metal production has been made since the beginning of the present century. In the 10 years 1921-1930 the rate of production of lead was 21 times as great as for the first 50 years of the nineteenth century, of copper 52 times as great, of zinc 96 times, of gold 24 times, of silver 11 times. As a result of this acceleration more silver has been produced in the last 30 years than in the previous 105 years, more gold in the last 26 years than in the previous 107 years, more copper in 18 years than in the preceding 115 years, and similar striking comparisons can be made for other base metals. We rank first in the world in lead, zinc and copper output.

The United States has been the chief consumer of the metals. From 1921-1930 we consumed 39 percent of all the lead the world produced, 40 percent of the zinc, 50 percent of the copper. Our monetary requirements for gold and

silver have been enormous, and our use of silver in the arts and industries far exceeds that of any other country.

Then, too, the value of all our nonferrous metal production is only about one fourth of the value of our whole mineral output. The balance is supplied by iron, coal, oil and the nonmetallic minerals; coal and petroleum products amount to 52 percent, all metals and nonmetals to 48 percent.

Our average annual production of all minerals for 10 years before the depression was five and one third billions of dollars.

Our share in consumption of world production of coal was 37 percent, of pig iron 47 percent, of petroleum 75 percent. We consumed as much as we produced of the nonmetals. * * *

Now let us return to consideration of the age of mineral utilization, and analyze the values that are created by utilization. Our metal and nonmetal mineral consumption, excepting of fuels, is not, as in the case of foods, generally destructive. Minerals enter into an accumulating store of national wealth. More than half of them enter into enduring facilities: Buildings, metal and concrete bridges, roads, railroads, power-transmission and communication lines, water, sewerage and drainage systems. Much of the balance goes into temporary usage in machines, industrial, farm, and household tools and utensils, but a large part of the metals thus used are not consumed and destroyed but become permanent by returning as scrap to be refabricated, thus continuing in a revolving mineral fund.

Great areas of the west have boasted that they are strictly agricultural communities. In the past few years mines were closed or curtailed operations and the communities where this happened discovered that more than half their population had really depended upon mining. Close the mines and quarries for 10 years until present farm and household equipment wears out, city structures deteriorate and become obsolete, rails have to be replaced, storms blow wires from their poles, generators and motors fail to perform—do this and even farmers would be marching upon Congress to re-establish the mineral industry.

In the past 25 years the annual value of farm production increased 17 percent. The annual value of mineral products increased 77 percent, in step with an ex-

panding industrial life—until the hard times struck us.

VALUE OF MINERALS IN USE

Now let us consider further the enhanced value of some of the minerals as they enter into use. Iron ore sells, say, for about \$2.50 a ton. Two tons of ore should yield 1 ton of finished steel selling from \$30 to \$100 per ton for the principal industrial uses, or an average of around \$60 per ton. Here the raw material is enhanced ten-fold in value. But much of the ore is made into special alloys extensively used that sell from \$100 per ton up to several dollars per pound, and here the increment becomes bewildering. One pound of hair springs used in watches is worth about \$1,000. A ton is worth \$2,000,000,000.

It is safe to say that copper, lead, and zinc are at least tripled in value as the primary metal from the smelter passes into use as pipe, sheets, pigments, and fabricated products.

The fuels, too, increase in value through preparation for some of their principal uses. Coal at \$2 per ton yields products worth \$16.25 as it is treated in coke ovens. We all know that crude petroleum at \$1 a barrel of 41 gallons increases in value as it passes through refineries and the distribution system, for we pay 15 to 20 cents a gallon for gasoline, and a dollar or more for a gallon of lubricating oil.

The accrued value of steel and the chief nonferrous metals that have entered as raw materials into permanent or recurring use since 1800 is somewhat as follows:

About 1,150,000,000 tons of steel—worth about \$60,000,000,000.

About 47,000,000,000 pounds of copper that sold around 15 cents, therefore worth about \$7,000,000,000 in the unfabricated state.

About 46,000,000,000 pounds of lead, worth around \$2,400,000,000.

About 29,000,000,000 pounds of zinc, worth around \$1,450,000,000.

This gives a total for steel and nonferrous metals of \$60,850,000,000.

It appears safe to say that of this total \$50,000,000,000 worth is still in use. Of the metals *lost* in use, zinc suffers most, lead next, then iron, and copper last. In fact, the return of scrap iron, steel, and copper is one of the big problems confronting primary producers of these metals.

The nonmetallic minerals also take on a large added increment—the rock that enters concrete, building stone (300 percent), clay for high-grade bricks and tile (100-250 percent). They are used in enduring structures that last for scores, even hundreds, of years and thus contribute to lasting wealth, but they do not return to new uses. * * *

Agriculture can show as its part of the picture of national wealth only its productive land, since its products are destroyed as used. The forests supply lumber that formerly had somewhat lasting use, but in large construction lumber is now almost completely displaced by mineral products.

The entire wealth of the country in



DR. JOHN WELLINGTON FINCH

1932 was given as \$163,317,000,000. It is actually probably much more than this. From my point of view, between 60 and 70 percent of this had its origin in the mineral industries. Farm property, including machinery and equipment, in 1930 was valued by the census at \$57,245,000,000. Land and buildings were given as \$47,879,000,000, full value, or about 30 percent of the total property value in the country. About 10 percent might be allotted to forest property.

I am dwelling upon this picture solely to arouse our pride as mining men in our line of business, in the part we play in our modern civilization, and if possible to stiffen our backbones so that we will stand up and insist upon recognition by a public that, although profiting through us, yet ignores and seems to be unaware of us. * * *

ECONOMICS

In the past few years we have learned that new scientific gadgets are not in themselves enough. Disappearing markets, unemployment, disheartening surplus stocks of metals, and low-cost foreign raw materials are factors that have threatened the existence of mining in many districts. The nation some years ago, and mining people with it, reached industrial maturity and became fat and overprosperous. For 50 years before the hard times huge supplies of mineral raw materials were called for as the railway network was completed and all forms of manufacture expanded; also we went into a delirium of mining during the big war.

Now we discover that there is no insatiable demand for our wares. From 1920 to 1924 we found ourselves overdeveloped and overequipped; but were slow to admit it. Prices naturally

crumbled and slithered to unprofitable levels. What shall we do about it? It is both an engineering and a financial catastrophe, but I suspect that the engineer has studied the reasons why it happened and, better than all the king's horses and all the king's men, knows how to put Humpty Dumpty together again. * * *

Most metal producers in the past were content to dismiss their raw-material product from thought as it cleared the plant. Today, producers and engineers should begin systematically to follow mineral materials through all intermediate steps to ultimate uses, and to study the adjustment of producing capacity to local and world-wide trends as well as to influences that cause fluctuations in these. The engineer, capitalist, and executive need to be saturated with the economics of their business. Continued individualistic attitudes and company isolation are out of step with sound progress. Students of our times pretty generally agree that this, in large measure, was the cause of our recent industrial catastrophes. As I have stated, we have passed the pioneer stage when an unrestrained production was consumed to support an equally accelerating commercial growth.

GOVERNMENT AND MINERALS

Now that we have glanced at the larger picture—the importance of minerals in an age characterized by their utilization—we can view intelligently the part our Government can properly take in aiding that utilization. In its regular and permanent organizations the Federal Government touches the mineral industries mainly through three bureaus:

(1) The General Land Office controls land titles and regulates the acquisition of mining property on the public domain.

(2) The Geological Survey studies, maps, and reports upon the origin, characteristics, and extent of mineral deposits.

(3) The Bureau of Mines deals with their development, production, and utilization.

I shall not presume to discuss the functions of the General Land Office or the Geological Survey, but I shall try in the few remaining minutes to describe some of the more important work of the Bureau of Mines—the Government representative of the mineral producers.

First of all, I want to assure you that the bureau does not think it knows it all, or possesses wisdom greater than yours. But it is a fine clearing house of ideas, the majority of which originate with operators. Also, it is an established organization which, working with your Mining Congress and other mining associations, may be an agency through which much of this get-together program I am pleading for may be carried out.

The laws which created the Bureau of Mines and define its activities fortunately are broad enough to include within the scope of its investigations not only the technology of production, treatment, and utilization of all ores, metals, oils, gases, and other mineral substances

(Concluded on page 24)

Of all things . . .

IT cost the taxpayers a pretty penny for Congressional talk during the last session. . . . It figures at about \$800,000 to print what they said. . . . The last page of the *Congressional Record* for the session was numbered 15,204, exceeded only by the 16,428 pages of the first session of the 72nd Congress. . . . This session's final copy had 230 pages, figured at \$12,000 . . . 75 pages carried a speech by Rep. Lundeen of Minnesota . . . cost \$4,050. . . .

■ ■ ■ ■ ■
A further slowing up of Governmental machinery looms. . . . Now they have to let the ink dry when they sign an important paper instead of blotting it. . . . The Library of Congress advised that blotting seriously reduces the permanence of pen-and-ink writing. . . .

■ ■ ■ ■ ■
The Administration would like to know just how many unemployed there are. . . . It's confused by the varying figures put out by various organizations. . . . And the Department of Labor is ready to be sold on the idea of listing all "job-hunters" as unemployed—but not until there are fewer of them. . . . So anxious is the Administration to find out about unemployment that it has again postponed the unemployment survey. . . . The totals might not be good political reading just before election. . . .

■ ■ ■ ■ ■
The 74th Congress tried its best to set a record in lavishing money. . . . It didn't do badly. . . . Its \$4,880,000,000 works relief was the largest single peace-time appropriation in this or any other Nation. . . . But the 65th Congress is the record holder. . . . It passed three separate laws, each of which topped the four-billion-dollar mark of the latest Congress. . . . The 65th's largest was Public Law No. 193, approved July 9, 1918, which gave the War Department \$10,225,478,312.91. . . . Two others passed in 1917 by the same Congress were respectively for \$5,356,666,016 and \$5,666,834,397. . . .

■ ■ ■ ■ ■
The Civilian Conservation Corps is trying to climb two trees at the same time. . . . It has been unable to find enough recruits to bring it up to the 600,000 mark approved by the President . . . and at the same time it is trying to find private jobs for its enrollees. . . .

■ ■ ■ ■ ■
Hardly anyone believes the President's "breathing spell" letter just "happened." . . . Ray Moley, who nearly always helps with White House speeches, was around just before it came out. . . . So was Karl Bickel, business associate of Roy Howard to whom the letter was addressed. . . . Administration officials thought it was a master stroke in wooing business for the next campaign.

■ ■ ■ ■ ■
They've been painting the Capitol and the inside of the Senate Office Building. . . . A crew of 60 painters and helpers have been working for a month. . . . It's said to be a typical Government job . . . the painters falling all over each other. . . . The job won't be done for months yet. . . .

■ ■ ■ ■ ■
A favorite hiding-out spot for the painters is the ornate bathing pool for Senators in their office building. . . . Here the painters can lie down after their lunch for a rest on the padded rubbing tables. . . . And if somebody comes in, why, they are just looking the ceiling over to see if they missed touching up any of it. . . .

■ ■ ■ ■ ■
NRA's present "skeletonized force" is 2,760 persons. . . . Most of these jobs are good until at least January when a report on how the country is getting along without codes, is to be ready. . . . But these employes aren't going to be caught napping. . . . They like to work for Uncle Sam. . . . Which accounts for the beaten track from the Commerce Building to the new Labor Department Building. . . . What's in the Labor Building? . . . Oh, the Social Security Board which eventually figures to have the largest personnel of any Government department. . . .

■ ■ ■ ■ ■
The Administration was opposed to allowing industry to deduct charitable contributions under the new Tax Bill. . . . But the President, addressing private relief heads, made it plain that industry must support private welfare programs. . . . And Mrs. Roosevelt, addressing the same group, was even more blunt by warning that if life isn't made worth living for those in need they would become a menace to continuance of a civilization all can enjoy. . . .



Wheels of



Government

LEWIS DOUGLAS, ex-Director of the Budget, spoke to the mining men assembled at the Palmer House in Chicago on September 25 in attendance at the convention of the Western Division of the American Mining Congress. Mr. Douglas, whose knowledge of the financial affairs of the Federal Government is intimate, spoke from the heart—and straight from the shoulder. His expressions of deep concern over the spending program of our Federal Government are not new to him. He expressed concern over three years ago before he served, for a time, the present administration as Director of the Federal Budget.

The Federal public debt is now over thirty billions of dollars. Up to the time of the Civil War, our Federal Government expended \$2 per year per capita. At the present time the expenditure is \$62 per capita. The appropriations by the Seventy-fourth Congress are here-with set forth:

APPROPRIATIONS BY 74TH CONGRESS	
Treasury and Post Office.....	\$903,635,678
Legislative.....	20,746,760
Independent Offices.....	777,501,956
Interior.....	61,220,922
Agriculture.....	125,157,983
State, Justice, Commerce, Labor.....	98,561,895
Navy.....	158,684,379
Army (military).....	341,348,294
Army (nonmilitary).....	60,649,966
First Deficiency.....	112,633,830
Second Deficiency.....	272,901,233
Works Relief.....	4,500,000,000
RFC Add. App.....	500,000,000
App. by acts.....	\$8,233,042,912
Debt retirement and interest.....	\$2,200,000,000
Total appropriations.....	\$10,433,042,912

* Does not include \$380,000,000 unexpended balance previously appropriated.

† Includes annual permanent appropriations.

Does not require specific legislation.

‡ Does not include authorizations; i. e., naval building, \$300,000,000; Army air bases, \$130,000,000; etc., which must be made from later appropriations. Also does not include \$92,000,000 of Third Deficiency Bill and \$500,000,000 Rivers and Harbors Flood Control Bill, both defeated in closing days of session.

The Federal Departments in Washington have now settled down in the main to administrative duties and the majority of the departments have new legislation in line with which regulations are being developed. Independent agencies created by the Seventy-fourth Congress are establishing their offices and organizations

and developing their regulations. As to the administration, the national Congress and the country, it may be said that there was an off-tone at the time of adjournment. The adjournment without the enactment of the Third Deficiency Bill was a setback to the deft handling employed during the session to accomplish the passage of bills on controversial issues.

The lack of the ninety-two millions of dollars carried by the Third Deficiency Bill has been embarrassing to the expanded existing agencies as well as to the new National Labor Relations Board, Guffey Coal Control Act, Social Security Act, Rail Retirement Act, and Motor Carriers Transportation Act.

In the course of the hearings before the Committee on Ways and Means on the "share the wealth" and "tax the rich" Revenue Act of 1935, Chairman Doughton (Dem., N. C.) reiterated repeatedly that there was not and never had been such a thing as "must" legislation. This position, together with the action of some of the committees of the Congress and with certain action on the floor by both bodies, has in a measure modified the "rubber-stamp" stigma under which the House of Representatives in particular has been classified during the past three sessions of the Congress. On the whole, however, the first session of the Seventy-fourth Congress was held well in hand by the administration. Practically every important measure desired by the administration is now on the statute books essentially in the form originally planned.

The veto of the Veterans' Bonus Bill established a precedent when the President delivered the message in person. The House of Representatives over-rode the veto, but the Senate stood firm against payment of the adjusted service certificates. Numerous attempts were made to revive the bonus bill, and it is a problem which still must be met in the coming session of the Seventy-fourth Congress. Conceivably the payment might be made in silver dollars, thereby giving the Government a definite profit from the silver seigniorage.

On May 27, 1935, the Supreme Court,

in handing down the decision against the NIRA, administered an outstanding shock to "New Deal" legislation. The "Constitutionalists," who are particularly strong in the South, took courage from the action of the court and the "Expansionists" (those who desire to mold the Constitution to their ends) were spurred to renewed activity to accomplish the circumvention of that document. While the defeat of the NRA was a serious blow to the administration, it was not a death blow as so widely stated at the time of the decision. The comeback that the NIRA was intended to bring about was said by the "New Deal" advocates to have been accomplished. The feeling was general in the Congress that the NIRA was in the main only a temporary measure.

Activity was renewed to accomplish congressional action in the enactment of measures of so-called doubtful constitutionality which will again bring before the Supreme Court the question of just how far the Federal Government can proceed in the regulation of interstate commerce. Among the measures enacted under this category and which may be considered as clearly administration desired laws were the prevailing wage amendment to the work relief fund, the "death sentence" in the Public Utility Bill, the enactment of the Coal Stabilization Bill, and the National Labor Relations Act.

From the political angle the action of the administration and the Congress was clever, when we bear in mind the election campaign for 1936. There were several occasions when deft steering was necessary on the part of political leaders to handle situations which bore the threat of open breaks in the Democratic Party. The Congress smoothed over the error of the Economy Act, passed early in the Roosevelt regime and designed to save \$500,000,000 annually, by the enactment of Public Resolution No. 3, which restored the last of the cuts in pay to Federal employees. Also enacted was Public Law No. 312, restoring various benefits to World War veterans, as well as another bill by which the Spanish-

(Concluded on page 24)

The Beginning of Coal Mining

By EUGENE McAULIFFE *

THE earlier history of coal discovery and coal mining is shrouded in antiquity. Where it was first dug and used will doubtless continue, like the invention of the mariner's compass and the manufacture of gunpowder, to remain a mystery. Theophrastus, the pupil of Aristotle, who lived in 382 to 287 B. C., wrote about stones which "kindled and burned like charcoal." These stones were found in what is now the province of Genoa, Italy, and in Elis in Greece. As both Italy, and Greece now depend upon imported coal for a fuel supply, the small deposits of coal or "anthracites," as the material was then called by the Greeks, must have been of minor value.

There is some fragmentary evidence of the use of coal by the Romans who invaded England in the year 55 B. C., but it is very difficult from the record to differentiate between the charcoal and coal. In all probability the use of coal by that people was extremely limited. The Angles and Saxons arrived in the fifth century A. D., but the absence of reference to coal for fuel purposes by the Anglo-Saxon chroniclers would imply lack of interest, to say the least, in mineral fuel. This was but natural. England at that age was a forest clad country, only a very limited area occupied by town, village, or human habitation. That was the day of wood-log houses, huts built of poles wattled with mud, wooden spoons, ladles and dishes. Even the ploughs that tilled the small fields were of wood.

In the year 1085, William the Conqueror, caused a survey to be made of all England. This work, a monumental compilation yet in existence, was designated the Domesday Book. Minute in its completeness, and while it was said to have included every cow, sheep and pig, as well as the more important items of worth owned or controlled by the Crown and its subjects, no mention is made of coal or coal mining. In the century following, a further record of the lead and silver mining industries of the kingdom was made, again without mention of coal.

In the year 1094, the Normans undertook the work of constructing the stately Minister of Durham. This monastery was more than a church, serving as it did as a fortress to keep back the warlike Scot. By a charter granted by the Crown, St. Cuthbert and his monks of Durham were given a grant of land at

"Kolpishill" upon which to erect a smithy or workshop to be used in the building of their church. This grant is without date and as numerous seams of coal cropped in this vicinity, certain historians see a connection between the term "Kolpishill" (coal hill) and the use of coal by St. Cuthbert. It is more than probable, however, that St. Cuthbert used wood charcoal in his smithy.

With the Norman Conquest a new order appeared. England began to arise from the warlike and half savage state long occupied by its people. Masons were brought from the Continent and the work of erecting great feudal castles, churches and other substantial buildings, was undertaken. There was a "common law" that governed all affairs affecting the people, but that law "ran only where the plow ran; marsh and moor and woodland knew no master but the King himself; no law, but his absolute will." This will was, in part embodied in what was known as the "Forest Law." The digging of a pit of any sort, even for marl with which to fertilize the fields of the peasants, within the confines or in the vicinity of a forest was forbidden; this on account of the danger and inconvenience such occasioned the hunters of wild game.

In 1215 The Barons of England met King John at Runnymede, wresting from his reluctant hands the Magna Carta, the first bill of human rights. In 1217 John's successor, Henry III, by the granting of the "Forest Charter," further relaxed the severity of Norman rule and the sunlight of freedom was for the first time seen by the "Common Man." Given the right to enter the King's forests, clearing same and turning it into arable land, by the making of ponds and ditches, by digging marl and peat pits, and by the erection of fences, the people of England were at last free to break the surface of the land and to dig "cole."

Henry III ascended the throne in A. D. 1216. In the 91 years that covered the reign of Henry and his son Edward I, coal was found, dug, and made use of, in nearly every now known coal field of England and Wales. The great Northern or Newcastle-on-Tyne field of England was the scene of the beginning of the coal industry of Great Britain and the

world. Farther north fragments of coal torn from its resting place by the incessantly heavy action of the North Sea, were picked up along the Northumberland Coast. This "black stone" which burned like charcoal was, from the fact that it was borne in by the waves, called "Sea Coal."

Early in the thirteenth century, a grant was made to the monks of Newminster Abbey of some land on the Northumberland Coast near Blyth. The grant also conceded a road to the sea shore, with the right to recover sea weed (for fertilizing purposes) and for taking "sea coal wherever it could be found, over as much of the shore as belonged to the land."

Our twentieth century conception of the term "monk" illy fits the churchmen of the thirteenth century. At that time the church contained practically all of the genius and learning, as well as the major portion of the craftsmanship of the world. Pledged to celibacy, governed by austere religious tenets, the early monks, with a few exceptions, made a tremendous contribution toward man's emergence from semi-barbarism. This shaved and cowled class of England, Scotland, Wales, and Ireland were masons, carpenters, stock breeders, and farmers. They planned and built the great cathedrals and monasteries, they lifted the world into Christianity quite as much by their industry as by their prayers.

It is not difficult to understand, in the light of their many other activities, how the early churchmen of England were the first to win coal. It was the monks of Tynemouth, the ruins of whose priory yet stand at the mouth of the River Tyne, who really mined the first coal in England. No definite date of this beginning is of evidence (doubtless such exists among the old monastery records written in the crude Latin of that day) but in the year 1269, these men were loading coal on vessels at Tynemouth, for shipment perhaps to London, then but a straggling, dirty, evil-smelling wooden town, which had not as yet visioned its coming greatness. Newcastle-on-Tyne coal came into London town 300 years before Shakespeare.

The industry has traveled a long, long road, during the seven centuries that have elapsed since these earlier miners left their crucifixes and their heatless cells, their bodies clothed in rough homespun, their feet clad in woven grass sandals with their ruddy faces and

*President, Union Pacific Coal Co.

shaven poll shaded by their crows, to dig fuel for the market and for their fires and their smithys, from the croppings of what later came to be known as the "High Main" seam of the great Durham coal mining district of England. The first few creels of coal were won without aid of tools other than a bar or pole made of wood, at times shod with a point of iron. If one of these valiant souls could come back long enough to step on the deck of a cage, such as is used in the mines of England today, to be dropped a half mile or more into the earth, thereafter to be transported miles to the working face, there to see coal mined by machines and released by the use of explosives, he would doubtless feel that the simple miracles of his day, that he pondered over, perhaps brooded over and prayed for faith to believe, had been surpassed.

With the exhaustion of coal susceptible of surface mining, the second stage of the British coal industry appeared, that of mining from beneath the surface. The first underground method employed, known as the "bell" or "bee-hive" pit, was borrowed from the iron industry where undercover mining was first attempted in England. Like surface mining, the new method partook more of digging than mining, the task wholly performed by casting by hand, (the workman using wooden and iron tipped shovels) first, the material taken out in sinking down to the coal, and next, the coal itself. No written record of the "bee-hive" system of mining has been found, and the only knowledge we have of it is that derived from secondary excavations made in recent years. The small pits, about 3 ft. in diameter, when sunk through shallow cover, stood about 12 ft. between centers. When the bottom of the coal seam was reached the pit was widened out in the coal as far as it was safe to go, from one to one and one-half yards, and thereafter the pit was filled in with the material taken out of the next opening.

In the middle of the fourteenth century the necessity for additional coal, plus the scarcity of locations for shallow work, led to the third stage of coal mine development, the sinking of deep vertical pits. In the beginning sites were selected where natural drainage could be developed, and tunnels or drifts were cut horizontally through the strata from the lower level of the workings, draining the mine water off without the medium of pumping facilities.

The early history of the underground transport of coal constituted a sodden, slavish chapter in the life of the industry. The early monks were grown men and their task was a varied one, hewing and wedging coal from the face, thereafter to load it into a small wicker creel or corve, the distance carried relatively short. As the mines grew in number and capacity, the work became specialized and to the miner's unfortunate wife and elder daughters fell the work of bearing as it was called. The corves were so made as to fit upon the woman's back, a wide leather strap fastened across her forehead, and balancing the load as best she could she made her

way to the pit bottom, at times in utter darkness. Few coal seams were of sufficient height to admit of the bearer standing more than half erect, and in the thinner seams she was compelled to crawl upon her hands and knees, her flesh cut, bleeding and calloused, no word of pity for her lot forthcoming.

The collier of that day was a courageous but an uncouth and profane soul, and the lives of the wives and daughters who toiled in the pits were as bitter as gall. When the woman reached the pit bottom after carrying her load of as much as 170 lbs., a distance of 150 yds., she then ascended a series of ladders totaling from 50 to 120 ft. in height to the surface, thereafter climbing to the top of the pit hill where she emptied the corve. History records instances where a mother led her daughters through this pitiless routine all day or all night, she taking the lead with a load so heavy as required two persons to put it on her back, a lighted candle in her teeth, her daughters with loads commensurate with their strength following the gleam of the mother's candle. It is recorded that these poor slaves of the mines wept their way up the ladders from sheer physical suffering, singing

travel at an angle of perhaps 30 degrees, thus exerting his full strength in the task. Once at the pit bottom, the corve-bow was fastened to the rope by an iron hook and two men, through the medium of a crude windlass, raised the loaded corve to the surface, lowering it in turn when emptied. Centuries later the tram with wooden wheels running on wooden rails took the place of the sledge, and still later the corve and tram were combined in one unit, the horse impelled whim giving way to the hand windlass for hoisting purposes.

The men who pioneered the coal industry, early churchmen, were valiant souls. They toiled long and hard, not for the joy of a home with wife and children, for they were celibates, but for "the glory of God." Those who followed the monks of Durham were even more courageous. They took over the industry when it was in its swaddling clothes and with coal as a foundation, coupled with the genius of Watt, Newcomen, Trevithick, and many others, they built the greatest industrial nation the world, up to the eighteenth century, had ever seen.

The story of the bitter hardships borne by the early colliery workers, their wives, daughters, and their sons, is a somber and tragic one. Toiling from 10 to 12 hours, in badly ventilated mines hundreds of feet below the surface, working in seams of coal of a thickness in certain cases of but 10 or 12 in., the forces of nature in the form of chokedamp and its more deadly companion, firedamp, menacing them at every turn, they carried on, receiving in return a pittance that served only to maintain existence. It was out of such travail the kindlier, happier, easier conditions we now enjoy were born. Out of the loins of coal sprang the steam engine, which made possible the magnificent systems of land and marine transportation which bind together the world of today. Thereafter followed that subtle yet fascinatingly powerful friend of man, electricity, which, except to a negligible extent, must continue to depend on coal for its creation.

The coal industry and those who toil within it will some day come to sense its greatness, the measure of dignity it deserves. Owners will cease to waste the nation's heritage with the profligacy shown in the past, and they will likewise cease to ask a portion of their workmen to toil for a starvation wage in order that their lack of business unity may be offset. Those who assume to speak for mine labor will likewise think more in terms of the general welfare of the men, women, and children they serve, and less in terms of securing, and thereafter holding to themselves a petty leadership, too often made financially attractive by the theft of a portion of the earnings of those they represent.

After all, there is a romance that attaches to coal. It is expressed in the genius and the courage of the men who laid the foundation of Britain's greatness, and likewise more than aided the creation of the "Land of Opportunity," America. That same courage yet exists.

(Concluded on page 20)



EUGENE McAULIFFE

hysterically through the descent, the contrast so great. If humanity were not possessed of a divine spark the race would not have survived some of the bestialities it has been compelled to endure.

As the length of haul increased, wooden sledges were developed, the corves now taking the form of circular baskets generally woven from the osier. The hewers helped put the corves on the sledge and two men, where the seam was high enough, dragged and pushed the sledge over the mucky bottom to the pit. Where the seam was thinner boys took the place of men, and the lad in the lead wore a leather harness with a wide band across the forehead, enabling him to

Electric Equipment

for Homestake's New Hoist

By R. S. SAGE*

THE new Ross shaft of the Homestake Mining Company, which was recently completed at Lead, S. Dak., was constructed because of the forced abandonment of some of the other producing shafts due to caving ground, because of the location of ore at greater depth, and because of the desire for greater tonnage output. Early anticipation of this program gave opportunity for a thorough study of all features of the hoisting equipment which would influence its suitability for the operating conditions and its effectiveness and efficiency during operation. This study undertaken by the engineering staff of the mining company in collaboration with the manufacturers of the mechanical and electrical parts, covered consideration of a number of alternative designs, including various styles and sizes of winding drums, various rope speeds and motor speeds, as well as counterweight sizes, flywheel weights, methods of electrical and mechanical connections, types of control equipment, etc. Large numbers of electrical load diagrams were made in order to determine the power requirements for each case studied. In the case of the man-and-material hoist, judgment played a large part in the selection of the capacity of the electrical equipment because of the large variety of "run-around" work required of such hoists, and the lack of any uniform or definite operating cycle.

The calculation of the load diagrams, always an interesting procedure for bicylindroconical drums, was especially so for the man-and-material hoist, for various partial lifts, it being noted that the counterweight drum ordinarily is left clutched in a fixed position on the driving shaft.

These equipments, 3,000 hp. for the ore hoist and 1,500 hp. for the man-and-material hoist, are noteworthy, first for their extraordinary size, surpassing even the largest copper ore hoist in the United States, and because of the novel manner in which the drums are designed and disposed with reference to one another. The drums are of the bicylindroconical type, mounted upon separate shafts placed parallel, tied together by means of a

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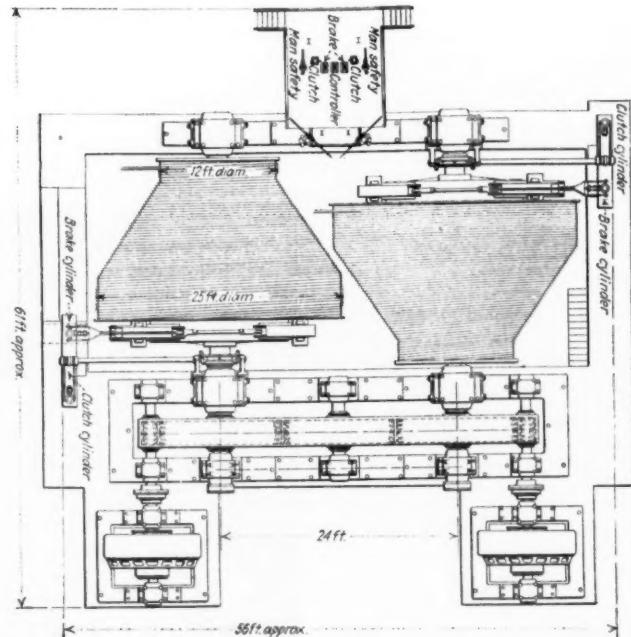


Figure 1. Plan Drawing of Ore Hoist, Showing Arrangement of Drums, Driving Gears, Bearings, and Motors

gear train and driven by motors coupled to the pinion shafts, two in the case of the ore and one for the man-and-material hoist. In brief, the major factor influencing the selection of this particular drum design was the desire to wind the entire cable on the drum in one layer, thus avoiding cable wear incident to winding in layers. To accomplish this with drums mounted end to end, would have resulted in an excessive rope fleet angle and the use of drums of simple cylindrical form would have meant higher cost and greater power consumption. The special arrangement as well as the speed of the drums themselves, 35 r.p.m., precluded direct-connected motors from consideration as a practicable proposition.

The mechanical equipment was designed and constructed by the Nordberg Manufacturing Company, Milwaukee, Wis., and the complete electrical equip-

ment by the General Electric Company, Schenectady, N. Y. In Figure 1 is shown a plan drawing of the ore hoist with driving motors, and in Figure 2 a photographic view of the motors and the drive end of the drums.

BASIC OPERATING CONDITIONS

The final data upon which the capacity of the electrical equipment was based were as follows:

Ore Hoist

Vertical lift—two compartment skip hoist,	5,275 ft.
Normal operation—skips in counterbalance.	
Maximum vertical lift.....	5,275 ft.
Levels at every 150 ft. between 2,200 ft. and.....	5,275 ft.
Weight of each skip.....	12,500 lbs.
Weight of ore per skip.....	14,000 lbs.
Diameter of hoisting cable..	1 1/8-in.
Weight of hoisting cable per ft.	5.63 lbs.

Weight of cable per side (maximum)	29,700 lbs.
Hoist drums—double bicylindrical, cross gear connected, both with clutches.	
WR of drums, gears, pinions and sheaves 30,000,000 lbs. ft.	
Rated maximum speed of drums 35 rpm.	
Normal time for acceleration.. 15 sec.	
Normal time for retardation.. 15 sec.	
Time for loading (average) .. 6 sec.	
Assumed mechanical efficiency 80 pct.	
Drum diameter	12 ft. to 25 ft.
Active rope turns—5,275-ft. lift:	
On 12-ft. cylinder	4.37
On cone	52.0
On 25-ft. cylinder	26.5

Single reduction gearing between drum shaft and motors.

The specified basic minimum tonnage output used for the determination of the speed of the drums and the capacity of the electrical equipment were:

	Tons
4,000 ft. depth..... (15 hr.) ..	3,000
3,000 ft. depth..... (15 hr.) ..	4,000

The contemplated tonnage schedule for 15 hours was expressed in terms of the following:

	Tons
2,200 ft. depth.....	1,500
2,600 ft. depth.....	1,000
3,200 ft. depth.....	1,000
All lower levels.....	500
Total.....	4,000

Assuming hoisting to be carried on at the maximum possible rate, the actual possible daily tonnages (15 hours) would conform to the following:

	Tons
5,275 ft. depth.....	3,225
4,000 ft. depth.....	3,210
3,200 ft. depth.....	4,070
3,000 ft. depth.....	4,340
2,600 ft. depth.....	4,850
2,200 ft. depth.....	5,475

From this tabulation it is evident that the basic outputs may be exceeded by adequate margins. The equipment is also capable of operating the hoist for occasional trips with a fully loaded skip without the benefit of a counterbalancing skip in the opposite compartment.

Man-and-Material Hoist

Vertical lift—single compartment cage hoist with counterweight.	
Maximum lift (to collar).....	5,200 ft.
Weight of single-deck cage... 4,000 lbs.	
Weight of two empty cars... 3,000 lbs.	
Load in two cars.....	4,000 lbs.
Counterweight	9,000 lbs.
Rope diameter	1 1/2-in.
Weight of hoisting cable per ft.	4.2 lbs.
Hoist drums same as for ore hoist.	
Rated speed of drums.....	35 rpm.
Normal time for acceleration.. 20 sec.	
Normal time for retardation.. 15 sec.	
Average loading time when handling rock	30 sec.
Average loading time except handling rock	15 sec.

In order to describe further the service expected from this hoist, the duty was specified in the following terms:

1. With counterbalance in action, to hoist rock from any of the lower levels to the 2,500-ft. level, such lifts ranging from 500 ft. to 2,500 ft.

2. To make occasional trips up or down the entire length of the shaft with 10,000 lb. load on cage, counterbalance in action.

3. To lower and hoist men at the beginning and end of shifts between all levels and the surface, the man load to be 5,600 lbs. and such operating periods to average 30 minutes each.

4. To operate for continuous periods on general run-around work with an average load of 2,000 lbs. on the cage. This duty to include trips up and down between various levels in all variety of manners.

5. To hoist men in an emergency without counterweight from any level.

Some of the calculated load diagrams for both the ore and man hoists are shown in Figs. 3 and 4.

MACHINE RATINGS

Based upon these duty cycles and the specified operating conditions, the following electrical equipment was selected:

Ore hoist motors: Two 1,500 hp., 300 r.p.m., 600 volts.

Motor-generator: Two 1,250 kw., 720

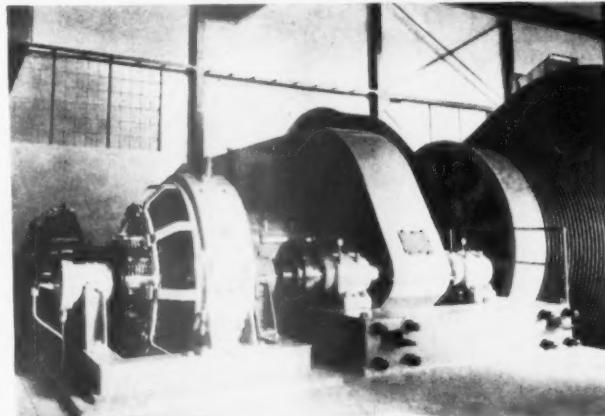


Figure 2. Ore Hoist, Showing Motors and Drive End of Drums. (Before Attaching Cables)

r.p.m., 600 volt generators. One 1,750 hp., 720 r.p.m., 2,200 volt induction motor. One 40 kw., 720 r.p.m., 125 volt exciter. One 44-ton steel plate flywheel.

Man hoist motor: One 1,500 hp., 300 r.p.m., 600 volts.

Motor-generator: One 1,250 kw., 720 r.p.m., 600 volt generator. One 800 hp., 720 r.p.m., 2,200 volt induction motor. One 20 kw., 720 r.p.m., 125 volt exciter. One 34-ton steel plate flywheel.

With both equipments was included the necessary control apparatus for the reversible operation of the hoist motors on the adjustable generator voltage control (Ward Leonard) system. This apparatus includes the liquid slip regulators necessary to secure the benefit of

load equalization by means of the flywheels.

After careful consideration, dual motor drive was adopted for the ore hoist in spite of its cost being somewhat higher than that of a single driving motor. Dual motor drive presented several desirable features: the face of the driving gears could be reduced; the motors and generators became exact duplicates of the corresponding parts for the man hoist; the number of spares was reduced and the interchangeability of parts afforded a greater security against outage due to breakdowns.

The adjustable generator voltage control system for these hoists was clearly indicated, primarily as a consequence of the necessity for an equalizing means for the fluctuating loads which otherwise would have been thrown directly upon the power system, an intolerable condition in this case. Also, only this system assured the control and handling of such a large hoist in a safe and reliable manner.

PERFORMANCE DATA

Calculated operating performance to be expected from these hoists is given in the tabulation which follows. In Figs. 3 and 4 are shown the calculated load diagrams corresponding to the various conditions covered by the tabulations.

Cycles (h) and (i) actually would be performed at reduced speed, the slip regulator being blocked and the induction motor being permitted to carry the entire load.

The flywheels were selected on the basis of complete load cycle equalization for the ore hoist and on the basis of the emergency cycle for the man hoist. The normal working speed reductions of the flywheels were maintained at values varying from 13 percent to 18 percent for the basic duty cycles.

The ratings of all machines were based upon a temperature rise of not over 40 degrees C. for continuous operation.

DESCRIPTION OF DRIVING APPARATUS

The hoist motors are connected by flexible couplings to the hoist pinion shafts as shown in the plan drawing, two for the ore and one for the man hoist. The motors are of the latest type construction with rolled steel field magnet frames and electrically fabricated armature spiders and bases. The advantages of rolled steel in securing homogeneous magnet structures and in obtaining greater strength per pound of material have been clearly demonstrated, and this practice is now fully established. The armature spiders are secured to the shafts by means of double tangential split keys, as are the Falk flexible couplings.

Ore Hoist—Fig. 3

Diagram	Depth	Motor Rms	Peak load	Input to set	Kwh. consumed	Eff.
	Ft.	Hp.	Hp.	Hp.		
(a)	5,275	1,600	3,410	1,585	53.7	51.7%
(b)	2,200	3,050	5,064	1,720	24.6	47.0%
(c)	3,200	2,470	4,515	1,675	32.3	52.2%
(d)	2,600	2,570	4,537	1,670	27.0	50.7%

Man Hoist—Fig. 4

Diagram	Depth	Motor Rms	Peak load	Input to set	Load
		Hp.	Hp.	Hp.	
(a)	5,275 ft. to top	1,025	2,110	675	5,600 men
(b)	3,400 ft. to 2,500 ft.	1,565	2,030	675	4,000 rock
(c)	5,275 ft. to top	1,155	2,295	860	10,000 loco.
(d)	2,600 ft. to top	1,320	1,630	675	2,000 rock
(e)	5,275 ft. to 2,775 ft.	1,200	2,120	675	4,000 rock
(f)	3,000 ft. to 2,500 ft.	1,545	2,080	675	4,000 rock
(g)	2,500 ft. to 3,000 ft.	1,220	1,630	675	4,000 rock
(h)	5,275 ft. to top	1,770	2,465	1,290	5,600 *
(i)	top to 5,275 ft.	1,245	2,340	1,200	Cage *

* No counterweight.

In order to commutate the currents successfully during acceleration and other overload conditions, both commutating poles and pole face windings are employed. In the motor-generator sets, welded steel construction is also used to a large degree, the only large castings being the bearing pedestals and the rotor spiders.

All bearings are of an improved design in which effective means of preventing leakage of oil are employed. Lubrication of all bearings is by revolving rings, the cooling of those supporting the flywheels being assisted by copper coils imbedded in the bearing lining for connection to the local water supply. Oil to these bearings is also supplied during starting, from small individual positive displacement pumps in order to reduce the effort necessary to breakaway from rest, this expedient very materially reducing the power required to start.

During a test after installation the ore hoist motor-generator set started on 725 kw. and reached full speed in approximately 12 minutes. It was brought to rest in about 4 minutes by plugging the induction motor, the peak power taken ranging from 1,140 kw. to 1,400 kw.

The generators are similar to the hoist motors with respect to the use of commutating poles and pole face windings, the successful commutation of the heavy current surges at low voltages requiring these features, as well as the use of involute equalizer leads between the armature conductors and the commutator bars.

The main field windings of the d.c. machines are separately excited from the 250-volt exciters.

The induction motors are of the wound-rotor type necessary for securing

the required variation in speed for the effective use of the flywheels. The capacity of these motors corresponds to the average load requirements of the hoist during a hoisting cycle. As the peak loads are carried by the flywheels the load on the motors is nearly uniform.

The size of the flywheels was determined by the specification that all normal duty cycles must be completely equalized, that is, that all load developed by the generator above the average must be carried by the wheel. The wheels themselves are constructed of rolled steel plates 116 in. in diameter, giving a maximum peripheral speed of 22,000 ft. per minute. The weights were established on the basis of values of working speed reductions as great as practicable without unduly handicapping the generator design nor too greatly affecting the speed regulation of the hoist. Factory tests showed 44.3 kw. was required to drive the 44-ton wheel and 31 kw. for the 33½-ton wheel.

The energy stored in the wheels at synchronous speed amounts to 164,000 and 126,000 hp. seconds for the large and small wheels respectively. If it were practicable to utilize all of its stored energy, the wheel for the ore hoist would be capable of lifting a full skip from the 3,200-ft. level to the dump. When operating on the most severe balanced load cycle, the speed reduction for the ore hoist motor-generator is 18 percent and the energy supplied by the wheel for operating the generator is 47,500 hp. seconds.

In Fig. 5 is shown a view of the ore hoist motor-generator set after installation.

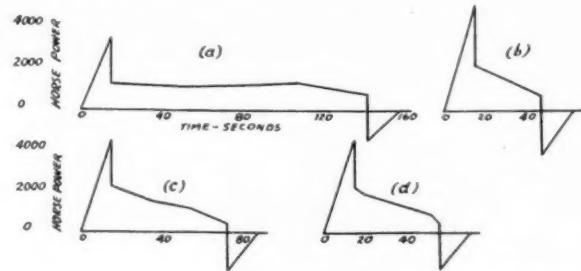


Figure 3. Calculated Power Diagrams for Balanced Operation of Ore Hoist

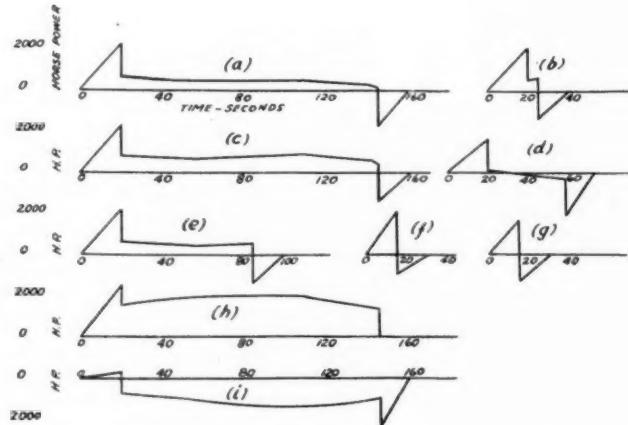


Figure 4. Calculated Power Diagrams for Various Operating Conditions

CONTROL SYSTEM

The adjustable generator voltage control system (Ward Leonard) employed for both hoists, provides a means of starting, stopping and maneuvering the skips and cage with ease, precision and safety. The speed of the hoist motor is controlled by impressing on its armature the variable voltage of the generator, and its direction of rotation is determined by the polarity of this voltage. As the motor field is maintained at uniform value, the speed is closely proportional to the applied voltage regardless of the load at its coupling.

Nicety of control is thereby afforded under the varying load conditions which exist while hoisting and retarding. When retarding there is developed a dynamic braking effect as a result of the automatic reversal of the current flowing between the motor and generator as the generator field current is stepped down in value by the operator in moving the master switch toward the "off" position. Actually the functions of the two machines invert, the motor becoming at this time a generator, through which the energy of the moving hoist system is loaded back into the flywheel motor-generator set (or power lines). The mechanical brakes therefore are not necessary to stop the hoist but are reserved principally to hold the drums stationary between trips. As a further consequence of this power regenerative feature, overhauling loads may be lowered as positively and safely as when hoisted and without any consumption of energy or wear on the mechanical brakes.

The armature windings of the hoist motor and its generator are connected in series, a single pole overload circuit breaker being interposed in one line. In the case of the ore hoist, the four armatures are connected in the alternate or "staggered" sense as indicated in Fig. 6, all receiving exactly the same current,

Largest metal mine hoist in the United States.

Hoist drums mounted upon parallel shafts.

Hoists together weigh two and one-quarter million pounds and Electrical equipment one-half million pounds more.

Hoist house 210 ft. and 80-ft. floor space.

A mile of $1\frac{1}{8}$ -in. cable in one layer on each drum.

Cable weighs more than skip and ore.

Flywheel on ore hoist motor generator set weighs 44 tons, has a peripheral velocity of over 4 miles per minute and stores 164,000 hp. seconds.

Hoist motor develops peak loads of 5,000 hp. but flywheel limits demand on power supply to 1,700 hp.

Full control of hoist accomplished by adjusting and reversing generator field current through controller handling but 1/6 ampere.

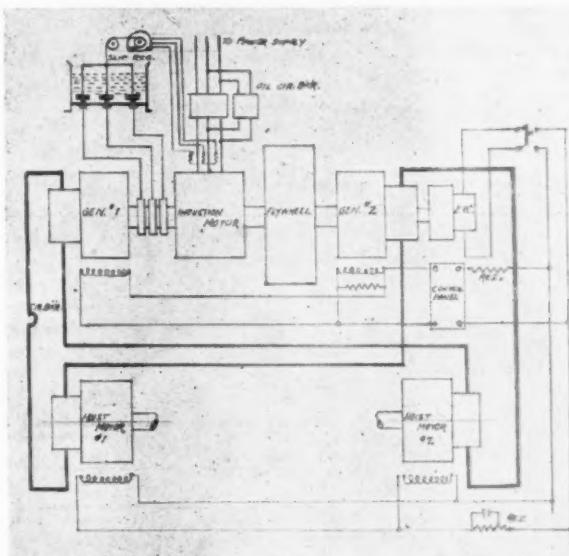


Figure 6. Schematic Diagram Showing Principal Connections for Electrical Equipment for Ore Hoist Which Is Driven by Two 1500-hp. Motors

which with uniform motor and generator field strengthens, insures equal division of load among the machines.

Speed variation of the induction motor is obtained by means of an automatic liquid slip regulator, which in response to the current taken by the motor inserts resistance in the rotor winding when this current exceeds a preset value. In this manner the load carried by the induction motor is maintained at a uniform value (the average of the load cycle) and the excess is contributed by the flywheel as the set slows down. When the peak load passes, the set recovers its speed, which is again at its maximum value by the time the next cycle is started. Thus, due to the smoothing-out action of the flywheel, the heavy loads developed by the hoist motor are kept from reaching the power supply lines and disturbances thereto are obviated. The slip regulator is capable of ready adjustment of the power input to conform to various operating conditions when hoisted from various levels, or at different speeds or with various loads.

An exciter included with each motor - generator supplies the exciting current to the field windings and to the various control devices, brake solenoids, etc. A new type of carbon-pile voltage regulator maintains the exciter voltage at 250 volts regardless of speed variation down to 65 percent synchronous speed.

CONTROL EQUIPMENT

The principal items of control are the master switch and the main control panel, the latter containing the magnetic con-

tactors controlling the amount of resistance in the generator field circuit and its polarity and therefore the value of the generator voltage and the speed and direction of rotation of the hoist motor. On this panel are also the various auxiliary contactors, relays, etc.

Through the reversible master switch, the operator has hand control of the motor speed over 12 graduated steps from standstill to full speed in both directions of rotation. In addition, automatic acceleration is provided whereby, if the master switch should be moved instantly to the full speed position, the contactors will close in proper sequence under the control of current limit relays and the hoist brought gradually to full speed without the motor current exceeding the value for which these relays are adjusted. The first three points are arranged for hand control only, for maneuvering at slow speeds.

The accelerating relays of which there is one for each nine of the 11 field contactors, are of a recently developed type featuring light but sturdy construction, silver contact tips, positive action and a low range between "pick-up" and "drop-out" current values. Their operating coils are shunted across the terminals of the hoist motor commutating field and so function on current proportional to that flowing between the motor and generator.

Similar relays, whose coils are connected across the generator armature, provide a limit on the rate at which the hoist may be retarded, thereby affording protection against excessive currents and abusive handling.

All contactors are single pole, of 80-ampere capacity with d.c. operating coils and magnetic blowouts, those used for reversing being both mechanically and electrically interlocked against simultaneous operation.

The master switch has silver-tipped fingers actuated by cams on the operating shaft, an arm which is connected by a reach rod to the operator's lever.

The liquid slip regulator is an improved design, featuring low inertia with consequent greater sensitivity, and high resistance ratio, which obviates the need of an auxiliary resistor for plugging the induction motor to obtain a quick stop.

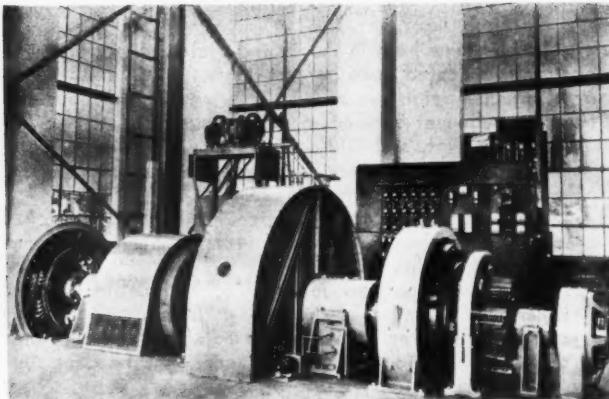


Figure 5. View of Motor-Generator Set for Ore Hoist

The two-panel switchboard for each hoist contains an oil circuit breaker with overload and undervoltage tripping devices, a triple pole oil switch for reversing the induction motor, the d.c. overload air circuit breaker with trip coil, a.c. and d.c. instruments, etc.

In order to reduce the losses in the hoist motor field coils, as well as their temperature, a contactor is arranged to insert a resistor in series with these coils whenever the master switch remains in the "off" position longer than 15 seconds, a magnetic time relay maintaining the contactor closed for this period of time. On the first point of the master switch this contactor closes and establishes the motor field current at its full normal value.

Electric tachometers are fitted to the motor-generator and hoist motors and their corresponding speed indicators are mounted on a panel together with a d.c. voltmeter and ammeter located in front of the operator. These indicators read in r.p.m. and f.p.m. respectively. A small relay, also connected to the motor-generator set tachometer, closes an alarm circuit if the speed falls below 70 percent synchronous speed, as a warning that the unstable operation point is being approached since the exciter voltage may break down at 65 percent speed. An auxiliary resistor, connected in the generator field circuit, is normally short-circuited by a contactor controlled from the operator's stand, whereby when desired, such as when handling men, the speed of the drums may be limited to half normal value.

It is but natural that full advantage has been taken of the adaptability of this control scheme to the application of effective protective features. To this end each of the mechanical brakes is equipped with normally energized tripping solenoids which when deenergized cause the brakes to be applied. Such an emergency application is caused to take place in the event of any of the following conditions:

- (a) D.c. overload.
- (b) Loss of motor field current.
- (c) Loss of exciter voltage.
- (d) Overspeed of motor-generator set.
- (e) Opening of hand emergency switch.

- (f) Overspeed when approaching dumping point.
- (g) Overtravel of normal stopping point.

Any of these conditions results in the simultaneous tripping of the air circuit breaker, the main control contactor and the brake solenoid contactor. Excessive speed when nearing the dump as well as overtravel are taken care of by the Lilly Hoist Controller, overtravel protection being also afforded by limit switches installed in the shaft guides. Over-frequency on the power supply system causes a complete shutdown including the motor-generator set. After any emergency shutdown, the hoist brakes can be released and power again applied to the hoist motor only after the master switch has been placed in the "off," and the brake lever placed in the "set" positions and the air circuit breaker reclosed.

"Back-out" switches on an auxiliary panel located on the operator's platform permit backing down from an overtravel position but are so connected that further upward motion is impossible until the skip is fully backed out.

As a further assurance of safe and positive slow-down near the dumping point, each drum has geared to it a cam turnoff device which automatically returns the master switch to the "off" position should the operator fail to do so.

In the case of a motor and generator with their armatures solidly connected together, it is well known that with the master switch in the "off" position, if the generator exhibits any tendency of voltage instability, sufficient voltage may be generated to cause a large current to flow between the machines, tending to rotate the drums against the mechanical brakes. To obviate this, the generator field winding is connected across its armature terminals when the master switch is placed in the "off" position, this connection being such that any voltage developed passes a current through the field in the direction to buck down such voltage. This so-called "suicide" connection is accomplished by a pair of contactors, energized when the master switch is in the neutral position, a voltage relay, however, holding these contactors open until the generator voltage

has reached a low enough value to permit this safely. The Homestake generators include a novel feature designed to supplement the "suicide" connection, in that the pole-face windings instead of being uniformly distributed over the face of the pole pieces, have the conductors off-set toward the trailing pole tips. Tests have demonstrated the effectiveness of this device in securing stability under high-current, low-voltage conditions, and the circulating current has been limited to a negligible value.

The accessory equipment includes magnetic starters for the two $\frac{3}{4}$ -hp. motors for the high-pressure oil pumps for the flywheel bearings and the two 2-hp. motors driving the pumps for the hoist oil pressure system. These starters are mounted upon the control panel, the push buttons for the flywheel bearing pump motors being mounted on the switchgear panel and those for the hoist pump motors on the operator's platform.

The entire apparatus for both hoists is installed in a single brick building approximately 210 ft. long by 80 ft. wide. The ore hoist was first started in March and the man hoist in July of last year, the duty upon the ore hoist being up to this writing chiefly limited to sinking and miscellaneous service.

The equipment for the Ross shaft hoists marks a milestone in the development of the electric hoist and, incorporating as it does unique features in both the mechanical and electrical design, will engage the interest of many employed in the operation and management of the larger metal mines both here and abroad. Furthermore, this installation is an added testimonial to the courage and progressiveness which has characterized Homestake management present and past and so largely contributed to the outstanding success of this famous 58-year-old mine.

The Beginning of Coal Mining

(Continued from page 15)

It remains to recover and apply to the solution of the industry's economic problems the genius that drove the deep shafts to new and then amazing depths, that visioned the early atmospheric pumping engines and translated the wagon pulled by horsepower into the locomotive that today moves the land commerce of the world.

EDITOR'S NOTE: This article is extracted from a book "The Romance and Tragedy of Coal" that was written by Mr. McAuliffe in 1931. In the present day efforts to plan the future of coal mining, it is not wasting time to devote a few moments in thinking of the tremendous advance that the industry has already made since its beginning over 700 years ago.

The National Industrial Stores Association, the national organization for industrial or company store executives held its ninth annual convention at the Hotel William Penn, Pittsburgh, Pa., September 9-11.



Distant View of Mountain Belt Conveyor having 1,800-ft. Centers

A Continuous Flow, All Conveyor System

*Yesterday a Dream
Today a Reality*

*By W. B. FLEMING**



Chamber Conveyor Discharging Into Gathering Conveyor

A N all-conveyor mine, a dream a few years ago, is a successful reality today. The Harry Taylor Mine of the Penn Anthracite Mining Company has the distinction of being the first. This mine is working an isolated basin of coal in the northern field of the anthracite region, in the city of Scranton. Its daily capacity is 1,000 to 1,200 tons.

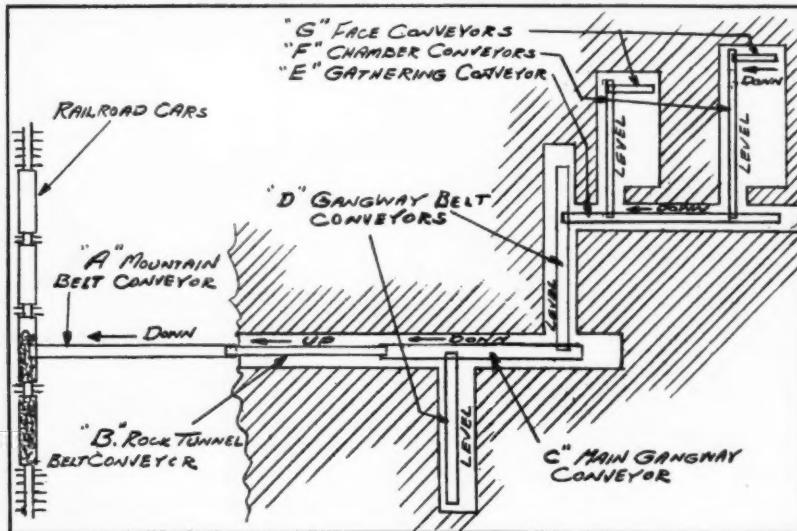
Perhaps the best way of picturing the operation is to describe it as being a continuous flow system, in which the coal flows uninterruptedly from face to railroad car, on conveyors every inch of the way. From the very start, the layout was designed and the mine developed for conveyor operation, under the direction of Mr. Thomas F. Steele, general manager. Inside, there is a system of belt and chain conveyors shown in portion in Fig. 1; outside, from the opening up on the mountain side, down to the railroad and loading point in the valley the coal flows on a single 30-inch belt conveyor *A* 1,800 feet long on an undulating hillside profile. From the loading point the railroad cars carry the coal to a central preparation plant.

A number of seams are available for ultimate extraction, but only two seams, being worked in proper sequence, provide the production at this writing—the Dunmore Nos. 2 and 4, which are separated by a rock interval of about 100 feet. These seams pitch prevailingly on a slope of about 15 degrees. The No. 2 seam averages 30 inches and the No. 4 about 36 inches of comparatively clean coal. They are reached by a rock tunnel slope, some 800 feet long at 15 degrees, which pierces both beds near the center of the tract.

In this rock slope a 30-inch belt conveyor *B* is permanently installed along one rib. On the clearance side is a mine track over which is transported all heavy machinery and supplies.

In line with and discharging onto the lower end of the slope belt conveyor in the rock tunnel is the head end of a type 52-B sectional belt conveyor *C*. This belt is 26 inches wide and 1,700 feet long. It extends up the pitch of the seam on a 15 degree slope, and so is on a grade in favor of the load. Discharging onto and from the right and left of the conveyor *C* are other 52-B sectional belt conveyors *D* in gangways 1,500 feet long on 350-foot centers. These, being driven on the strike, are level. Each level gangway entails a battery or group of five chambers. Off the belt gangway *D* at intervals of 240

* Underground Conveyor Engineer, The Jeffrey Manufacturing Co., Columbus, Ohio.



feet a cross cut is driven at right angles "up the pitch" in which are placed type 61-ES chain and flight conveyor *E*. These are 300 feet long and gather coal from the chambers till they have advanced 240 feet, when it is moved to the next cross cut. This is repeated until the chambers have reached the property line.

The chambers are worked to the property line and the pillars are brought back immediately upon the completion of the chamber driving. As the chambers are centered on the strike, the face lies on the pitch. Along the lower rib of the chamber is a 61-AM sectional chain-and-flight conveyor *F* which is extended with the advance of the chamber face until its length is 240 feet. Across the face is a 61-HG chain-and-flight type face conveyor *G* on a grade in favor of the load. In some parts of the mine the pitch of the seams is great enough that no face conveyor need be used. In that case sheet steel plates are laid on the floor at the face, before shooting, and most of the coal slides over them to the lower side of the room with little shoveling.

All the conveyors are connected into an interlocked control system. This arrangement prevents any piling up of coal at transfer points, for when any one conveyor stops, all conveyors behind it stop. To start the entire system or to resume running after a partial shutdown, each conveyor must be started separately by manual operation of a pushbutton at its respective power unit. This elimination of remote control in the starting is a safe-guard against the possibility of a workman being injured while extending a chamber conveyor or greasing belt idlers.

The all-conveyor system entirely eliminated a number of the old problems ordinarily encountered in arranging the transportation system. For one thing, there is no need for the more dangerous motive power units, as hoists, haulage motors or mules. On the other hand, many new problems were met in work-

ing out the details. The conveyors require different facilities and crew training for repairs and servicing. New methods had to be developed for moving workmen and supplies in and out of the mine. Track is limited to the main slopes such as *B* to facilitate the movement of heavy machinery.

Suitable conveyor equipment will not of itself solve the problems of low-seam mine mechanization. More important than even the equipment is management. Harry Taylor Mine, with its continuous flow conveyor system and concentrated layout, is predicated upon an entirely new operating management technique. In the old hand-loading system a foreman had charge of a large number of working places so widely scattered that seldom could he visit them more than once a day. In the new scheme a foreman is assigned no more than eight places. These being adjacent to each other, they can be better supervised and kept running on schedule. Also, supplies can be unloaded at a few strategic points for short-distance distribution to many working places. This concentration materially reduced the quality of supplies which must be carried at the mine.

Contrary to general anthracite mining practice, all coal is undercut, type 35-L low vein shortwall cutters are used. Thereby, blasting has been minimized as compared with shooting off the solid; the cost of explosives has been reduced; fewer accidents have occurred; and the yield of larger sizes has been improved. The machine is reversed after each cut and so operates alternately from one side to the other. Thus are avoided the hazards of moving the machine across the face between cuts and other hazards occurring in the use of cutting machines in pitching seams.

Each working place is equipped with its own cutting machine drill and conveyors. After a chamber is driven up and its protecting pillar robbed, the equipment is then moved but a short distance and the next nearest chamber

is started. In consequence, time is saved, moving costs held to a minimum and the likelihood of accidents is lowered. It is possible to move the machinery from one chamber to the other, make an initial cut and load it out, all in one shift.

"Executive Order"

BY VIRTUE of and pursuant to the authority vested in me by subdivisions (a) and (b) of section 2 of Title I of the National Industrial Recovery Act (48 Stat. 195), certain provisions of which Title were extended until April 1, 1936, by Public Resolution No. 26, 74th Congress, approved June 14, 1935, I hereby designate George L. Berry as Coordinator for Industrial Cooperation, and delegate to him the following functions and duties:

1. To supervise, subject to the direction of the President, conferences of representatives of industry, labor, and consumers for consideration of the best means of accelerating industrial recovery, eliminating unemployment, and maintaining business and labor standards.

2. To coordinate and report to the President on matters relating to appointment, employment, discharge, compensation and duties of officers and employees of the National Recovery Administration.

3. To receive from the Federal Trade Commission after consideration by the National Recovery Administration the provisions proposed under section 4 (a) of the National Industrial Recovery Act as require the approval of the President under the said section 4 (a) and under the Executive Order of September 26, 1935, delegating certain authority to the Federal Trade Commission, and to present the same to the President for his consideration.

The Administrator of the National Recovery Administration shall provide space and personnel adequate for the requirements of the work of the Coordinator. The Coordinator shall be paid such salary as may be fixed by the President.

"FRANKLIN D. ROOSEVELT."

SHIPMENTS of bauxite from mines in the United States in 1934 were 157,838 long tons, valued at \$1,129,053, an increase of 2.4 percent in quantity and of 22.3 percent in total value, as compared with 1933.

The Modern ELECTRIC CAP LAMP

as an Aid in CLEANING COAL[†]

By BORDEN MacVEAN*

ONE of the features of the design of a modern tipple to which much attention has been given in recent years is the proper and effective illumination of the tables over which the coal flows and upon which hand picking is practiced. Upon numerous occasions have technical articles been written and published demonstrating the value of good lighting in the facilities of an up-to-date preparation plant at a bituminous coal mine.

Why, then, should not even greater attention be given to the problem of effective illumination at the working face where the coal receives its first attention and initial exposure to the possibility of beneficiation by man. Any removal of free impurities at the time of loading into the mine car obviously means not only a reduction in the work required of the preparation plant but also the elimination of haulage of valueless material. Examples are known where, at a 3,000-ton mine, the delivery of refuse to the tipple has been reduced by an average over a period of months of 20 tons daily after an increase in effective illumination at the working face. Sizeable reductions in men employed on picking tables have been accomplished in this manner also.

Most of you, in general, are familiar with electric cap lamps, over 325,000 of which are now in daily use on this continent. Many, however, do not appreciate what tremendous advances have been made in the last five or six years in the amount of illumination available from these lamps. It was realized some years ago by the manufacturers of electric cap lamps that, in order to widen the scope of their market, it would be necessary to develop equipment which would actually be preferred by the miner as a working lamp over open flame lamps. As a by-product of the efforts to accomplish this, the electric cap lamps available today are so far superior to the open flame lamps in illuminating qualities that their installation, in many cases, has been motivated in recent years solely by the desire of the mine management to improve the coal preparation at the working face.

* Mine Safety Appliances Company.
† Presented before the Illinois Mining Institute,
July 8, 1935.

As an example of this, your attention is directed to information recently presented by Mr. Carel Robinson, manager of mines, Kelleys Creek Colliery Company, of Ward, W. Va., at the session of the American Mining Congress devoted to Coal Preparation.

About two years ago this company introduced the latest type of Edison electric cap lamp. Tonnage had previously been falling off due to orders lost on complaints of dirty coal. Since then, very marked improvements in the quality of the coal have been attained with resultant retention of market previously lost as well as a sizeable addition to tonnage formerly mined. Complaints were reduced almost to the vanishing point. It might be here said that the splint coal seams at Ward are free from explosive gas; the mines are drift mines, hence the basic reason for the change was to improve face illumination.

After the electric cap lamps had been in continual service at these mines for over a year and a half, the management determined they would investigate whether their step in changing to electric cap lamps was fundamentally sound and basically responsible for the improvement in the quality of the coal. The following method of investigation was used, this being an excerpt from Mr. Robinson's paper under the title of "Illumination in Relation to Preparation of Face," presented at the American Mining Congress under date of May 14, 1935.

A number of miners in different sections of the mine were furnished carbide lights and electric cap lamps. Each of the loaders was requested to alternate the use of each of the two types in loading alternate cars. He was also requested to try to use an equal effort to clean coal with each type of light. Careful time studies showed that the miner consumed 32 percent more time in cleaning and loading the cars with the carbide light than was required with light from the electric cap lamp. Each of the cars loaded as part of the test was marked for examination at the tipple. The impurities were removed and weighed, and

it was found that the coal loaded when wearing electric cap lamps contained on an average 25 percent less free impurities than when loaded with illumination from the carbide light.

"This measure of impurities was by the regular inspector on the 'jury table.' The 'jury' system at Ward is as follows: Provision is made on the tipple so that any car of coal can be passed from the regular flow to a special bin. From this bin it is fed to a short picking table and on this it can be minutely cleaned without interfering with production. All impurities are thrown into a box and weighed and clean coal carried forward on the picking table and mixed with the other coal. If excess impurity is found then the tipple boss and checkweighman are called down to inspect the impurities and a dock, or suspension, or discharge is imposed.

"To supplement the above practical test, I requested the Mine Engineering Department and the Electrical Engineering Department at the West Virginia University to make a series of comparisons to check up on the difference in illumination. These tests were made in the laboratory, at Morgantown and in two mines in the Pittsburgh seam near Morgantown. These tests showed that when the carbide lamps were first filled and lighted that the illumination was very nearly equal to the cap lamps. In a few minutes, however, the carbide lights began to flicker and the illumination was gradually reduced. On the other hand, the illumination from the electric cap lamps was almost constant through a period of five hours. To illustrate this, I will quote from one of the records which may be considered as typical:

9:45 P.M.	7	FCP
9:50 P.M.	8	"
10:00 P.M.	6.6	"
10:05 P.M.	4	"
10:10 P.M.	3.5	"
10:15 P.M.	3.7	"
10:20 P.M.	3.4	"
10:25 P.M.	2.7	"
10:30 P.M.	1.5	"
10:35 P.M.	1.6	"

"Carbide light taken from active use. Reflector had been blackened. The
(Concluded on page 24)

The Age of Mineral Utilization

(Continued from page 11)

but also prevention of waste, conservation of resources, and safeguarding health and lives of miners, together with economic studies of such factors as production, consumption, trade conditions, markets, and the movement and utilization of mineral commodities. * * *

The bureau is also supplying the need of industry and the public for better information about the characteristics of the different solid mineral fuels and their products, as well as information upon how coal disintegrates with storage or handling, whether it cakes in the fuel bed, how easily it can be pulverized, whether it is suitable for making gas or coke, and what chemicals can be derived from it. The bureau is also studying low-temperature carbonization of coal in the effort to find a solution for the smokeless-fuel problem, to accelerate the development by industry of commercial carbonizing processes, and to find uses for by-product oils and tars. It is also working on the extraction of motor fuel from coal and lignite—looking forward to the time when, after the exhaustion of petroleum reserves, an oil-from-coal industry will be a national necessity.

Vast hydroelectric power developments at Boulder Dam, Muscle Shoals, and other Federal projects emphasize the need for possible outlets for surplus power. The bureau is studying the possibilities of using this power in exploitation of mineral deposits, particularly along the lines of electrolytic and electrothermic production of aluminum, magnesium, and other metals.

During the past few years there has been an insistent demand for ore-testing services by the bureau. This work is now being undertaken—but in a field that will not compete with consulting engineers or commercial laboratories—by studies leading to the standardization of testing methods, by routine analyses and tests incident to investigations of the bureau and other Government agencies, and by chemical and microscopic analyses of ores that are typical of a mining district—with recommendations as to suitable ore-dressing practice.

A survey of the more important mining districts has been started—primarily to make an inventory of resources and production capacities, but incidentally to assist small operators where they cannot afford to employ competent engineers in the solution of their technical problems, thus preventing ill-advised and wasted expenditures of time and money.

The known reserves of petroleum and natural gas are not long-lived. Hence it is important that petroleum be produced, as needed, without waste and that as little as possible be left in the ground beyond recovery. The bureau's petroleum engineering research is designed to obtain the impartial data needed more than ever before by the Government and industry and to help in the solution of the technical difficulties involved in production, production control, and unit operation of new oil fields.

For 10 years previous to 1934, the Bureau joined with the Public Health Service in studies relating to the health of miners, particularly sanitation, the effects of harmful dust, and the causes and prevention of occupational diseases. This work has now been resumed and will include further investigations of dust diseases and of the many underground conditions that affect the health of employees.

The bureau's safety work comprises collection and dissemination of information pertaining to safety in the mining and allied industries, training in first-aid and mine-rescue methods, and recovery operations at mine disasters together with investigations of their causes and means of prevention. * * *

It is not my province to discuss the relations of Government to the mining business except in its technologic and economic aspects. The Bureau of Mines, as are the other technical Federal Bureaus, is nonpolitical and prohibited from commenting upon or participating in political or legislative matters. Not so the American Mining Congress. Through it you can seek purposefully to increase your influence and power by the development of closer cooperation among the individuals and groups that constitute the industry. It is probably too much to hope that the entire mineral business can get together because its units are so widely scattered, are concerned with so many different products, employ such a variety of technology, and are so intensively specialized. A common orientation of thought and purpose may be well nigh impossible. The American Mining Congress, however, offers an excellent organization through which mining people may take concerted action to improve their public relations and build up a stronger position of influence in the nation. The Mining Congress can do for you many things the Bureau is not designed or permitted to do. But the Mining Congress and the Bureau can supplement each other most effectively. * * *

In closing permit me to express, in behalf of the bureau, our deep appreciation of the effective aid the Mining Congress and its Bureau of Mines Committee gave us in our struggle to secure funds to enable us to resume a considerable part of the recessed work of the bureau. Although this rescued us from the state of deep discouragement in which you found the bureau last year, it is still not nearly enough to enable us to perform all the important work called for in this time of readjustment in the mining business. We all, as mining men, may be convinced that farming is far less important to the country commercially than we are, yet the fact remains that farmers have the benefit of appropriations for services similar to those of the Bureau of Mines amounting to about \$44,000,000. This is made up of the following items: Experiment stations, \$4,608,000; cooperative extension work, \$10,322,000; Bureau of Animal Industry, \$13,900,000; Bureau of Dairy Industry, \$650,000; Bureau of Plant Industry, \$4,500,000; Bureau of Chemistry and Soils, \$1,670,000; Bureau

of Entomology, \$2,200,000; Bureau of Agricultural Engineering, \$412,000; Bureau of Agricultural Economics, \$6,000,000; not to mention several smaller items; making a total of \$44,260,000. The bureau with this year's increase has \$1,994,011.

Wheels of Government

(Continued from page 13)

American War veterans are again receiving their pensions.

A further adroit political move was evidenced in the enactment of rail retirement and rail pension acts as an answer to the invalidation by the Supreme Court of a similar act of the Seventy-third Session of the Congress. Politically wise was the enactment of the Social Security Program, the National Labor Relations Act, the AAA amendments, and the Guffey Coal Stabilization Act.

Beyond question the National Congress, guided through the session by the administration, kept to the front the "welfare" of the wage earner, the small business man, the farmer, and the unemployed in preparation for the fall of 1936.

Electric Cap Lamp As Aid in Cleaning Coal

(Continued from page 23)

measurements with the foot candle power meter were made 15 inches straight in front of the lamp. The lamp was freshly charged and reservoir filled with water and water feed adjusted. Measurements were taken at intervals of five minutes and lamp was in motion between these:

"At this time the water feed was opened wide and the lamp vigorously shaken and then the water turned off to secure maximum pressure and illumination. By this means the candlepower was increased to 2.1. Thus in a period of 45 minutes there was a drop in illumination amounting to 74 percent."

While well over half of the bituminous coal today produced in the United States is mined with electric cap lamps, only about one-quarter of the tonnage of Illinois is so mined. All of the tonnage of Illinois mined with electric cap lamps originates in mines classified as gaseous and their introduction was actuated by reason of this.

A miner's lamp is the most important tool he carries. Without it he can do no work; with a good lamp he can be a very efficient miner. The modern electric cap lamp is rapidly replacing the open flame lamp in both coal and metal mines because it is a better tool. The purpose of this paper is merely to draw your attention to the fact that the use of the modern electric cap lamp can play a very able part in any campaign for the preparation of a cleaner coal from any coal mine in which part or all of the coal is being hand loaded.

Mining BISMUTH in Utah

By GEO. H. WATSON*

THIS article is concerned with a metal whose properties are comparatively unknown to the average metallurgist. This compilation of existing information is prepared as one of the early steps in a research on the extension of the discovered deposits and uses of bismuth.

Bismuth is one of the less familiar metals, although it has been known since the Middle Ages. Modern history of bismuth dates from about 1850. It is an individual metal.

Bismuth is a fairly common element, although it is neither abundant nor widely diffused in nature. Estimates of the weight percent of bismuth in the earth's crust as 10, of the same order as tungsten and silver, more abundant than gold or platinum, but less abundant than mercury, antimony, tin, and cadmium. Bismuth is found as native metal associated with gold, copper, silver, or other metals, and in a variety of ores. The more important ores are bismuthinite or bismuth glance, bismite or bismuth ochre. Bolivia has been the principal producer of bismuth up to 1930. The Cerro de Pasco mine in South America has been the principal producer since 1930. The Alta Merger mine now controlled by the Alta Champion Mining Company, at Alta, Utah, which is located 25 miles southeast of Salt Lake City, Utah, produced 18,000 pounds of bismuth during 1924, and was the largest producer of bismuth in the United States during 1924. The production from the Alta Merger mine during 1924 was stopped from the Discovery tunnel near the surface, the ore being bismuth ochre, and averaged .5 percent bismuth, 10 ounces silver, .5 percent copper, and .045 ounces gold per ton, the size of the ore shoot being 1 ft. wide and 10 ft. long.

During 1933 the Alta Champion Mining Company extended its Dwyer drain and transportation tunnel to a point 2,700 ft. in from its portal and encountered the downward extension of the bismuth ore shoot found in the Discovery tunnel near the surface hereinafter mentioned, the ore on this deep level being bismite or bismuthite with considerable bismuthinite or bismuth glance, and averages 3 percent bismuth, 14.5 ounces silver, 1.7 percent copper, and .065 ounces gold per ton, the size of the ore shoot being 3 ft. wide and 25 ft. long.

* Alta Champion Mining Co., Salt Lake City, Utah.



View of Alta Champion Mining Company

and 800 ft. of backs up to the Discovery tunnel level, and appears to be going below this deep level strong.

The world's production of bismuth is estimated to be about 800 tons per annum. About 85 percent of the total consumption of the metal has been consumed in the manufacture of pharmaceutical preparations and 15 percent by makers of fusible alloys up to 1934. The commercial uses of bismuth are increasing very rapidly and the percentage of bismuth used by the makers of fusible alloys will no doubt increase very rapidly, and continue to do so in the immediate future.

The market price of bismuth (as well as other metals) has been subject to wide fluctuations. In 20 years it has varied between \$1 and \$3 per pound and at present seems to be fairly stable at about \$1.10 per pound.

A wide variety of uses has been found for fusible alloys based on their low melting points. The principal use is in soldering operations, the selection of a particular alloy depending upon the conditions of that particular operation. A special soldering application arises from

the fact that several of the fusible alloys wet glass and melt at such low temperatures that they can be safely applied to glass. They are used, therefore, in making seals and gas-tight joints in glass apparatus. Another important use has been in safety devices, particularly in protection from fire. The melting of the fusible metal releases water pressure into a sprinkler system, operates an alarm, releases automatic fire doors, gives warning of excessive temperature and pressure in steam systems, etc. The temperature at which the device operates depends upon the melting point of the alloy chosen.

Baths of easily fusible metals have been used in a variety of quenching and drawing operations for the treatment of small tools and the like. A constant temperature bath can be obtained by choosing the proper alloy and maintaining the temperature within its melting range. The use of low-melting alloys in machine shop and in testing operations is growing in importance. Grips of low melting alloys can be cast on pieces of irregular cross section and can be removed

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A Declaration of Policy

The Western Division of The American Mining Congress, assembled in annual convention at Chicago, Ill., September 26, 1935, hereby reaffirms the principles and policies announced and approved by it at its annual meeting in San Francisco, Calif., in 1934, and further declares its views upon the following subjects of public policy:

CONSTITUTIONAL GOVERNMENT

We reaffirm our faith in and allegiance to the Constitution of this Nation and to its philosophy of Government. Under no other form of Government have people as a whole made such progress, enjoyed the better things of life, and preserved unto themselves and their posterity the blessings of a free people.

The people created the Federal Government, limited its power and activity, reserved unto the states and themselves all other rights and powers belonging to free citizens, and at the same time pledged the Federal Government to definite and certain guarantees of the inalienable rights of man.

The Supreme Court has said, "Extraordinary conditions do not create or enlarge constitutional meaning." We assert that extraordinary conditions have not lessened the obligation to respect and preserve to the individual the fundamental benefits assured by the Constitution to the humblest citizen.

We resent the attitude of many in authority in our Government who seek by specious use of words, phrases and interpretations, to nullify the plain intent and spirit of our Constitution. We look forward with confidence and faith to the time when the Supreme Court again will declare in language unmistakable that its provisions, made for the preservation of individual liberty and freedom of action, are yet valid and binding.

Any attempt to amend the Constitution of the United States to confer greater power and authority upon the central government should be carefully scrutinized for its effect upon the liberties guaranteed by the document itself. It must be remembered that all increase of governmental power in our country is made possible only through surrender of individual rights. We urge that those rights be zealously guarded and preserved.

BUREAUCRACY

Bureaucracy has grown to such an alarming extent that industry is now faced with a government, not by a system of checks and balances through legislative, judicial and executive branches, but a government by politically appointed commissions and administrators. Three-quarters of a million persons are employed by the Government, not counting the legislative and judicial branches, the Army and Navy, and special agents of the Department of Agriculture. Regimentation is reaching out to every phase of our American life.

We oppose this growth and urge a return to government by law instead of government by men, by statute instead of by executive order or administrative decree.

BALANCING THE BUDGET

Our Federal public debt is now in excess of thirty billions of dollars, and the appropriations made by the Seventy-fourth Congress were in excess of ten billion dollars. No government

can go on year after year spending more than it receives, and piling deficit upon deficit. Such a course inevitably destroys the currency, and leads to inflation and repudiation. Our Government should, therefore, take immediate steps to balance the Federal Budget by strict limitation of governmental expenditures. Taxes should be levied only to provide necessary revenue, and not to effect social reforms, or to carry out schemes of redistribution of wealth.

We affirm that it is the fundamental concept of our form of Government that the power of the purse should rest with the Congress of the United States, and we disapprove abdication by Congress of that function through delegation of the power of spending to executive agencies without legislative control.

TAXATION

Revenue laws and their administration should at all times take into account their effect on business activity and development. Tax laws which impose such a burden on business property, transactions and incomes, as will lessen business activity and remove incentive for business investment and development, will neither yield adequate revenues to the Government nor will they contribute to recovery. Particularly as to income taxation, the Government must deal fairly and justly with taxpayers, and it must not claim such an undue share of the income nor make such unreasonable and continually changing rules for determining the income as will leave little incentive to the taxpayer to give his energy, his ability and his initiative, and to take the business risk involved.

To the extent that recent Federal Revenue legislation transgresses these principles we believe it should be promptly revised and amended to conform to them.

Tax administration should be fair, honorable and above-board; as zealous to protect the rights of taxpayers as to get revenues for the Government; as ready to make refunds of over-payments as to collect additional assessments. Determination of a taxpayer's case should not be made in secret by those before whom he has had no opportunity to appear for a hearing, and the basis of whose decision he is not permitted to know. Treasury Department rulings and interpretations of the law should not be retroactively reversed or amended to the detriment of taxpayers who have made transactions relying upon them. Taxpayers should not be put to the inconvenience and expense of filing with the Bureau extended statements or tabulations in support of their returns, when such information is available in the books and records of the taxpayer subject to Bureau examination on the ground. The intricacies and involvements of our tax laws and regulations are so great that they pass the understanding of the ordinary taxpayer, and they become an intolerable burden unless he can feel, as he does not

now feel, that they will be administered by the Government in a spirit of zeal for the protection of the rights of the taxpayers.

In accord with the foregoing principles we specifically urge:

1. Income taxes should be imposed only upon a fair and equitable basis, and arbitrary rules for the computation of taxable income should be avoided.
2. The tax liabilities of affiliated groups of corporations should be based upon consolidated returns.
3. A business loss of any year should be allowable as a deduction from future income.
4. The tax upon dividends received by corporations should be promptly repealed.
5. The graduated tax upon corporate incomes should be abolished.
6. The administration of our tax laws should be restored to a fair, common-sense basis. Efforts to impose liabilities not contemplated by the statute should be abandoned. The Government should not force taxpayers into unnecessary litigation.
7. Arbitrary rulings, retroactive regulations, and difficulty of proof should not be the basis for denying the reasonable allowance for depreciation authorized by the law.
8. With reference to properties in the development stage, corporations should not be compelled to make final declaration of capital stock value for purposes of capital stock and excess profit taxes.

MONEY

The monetary system of our Government should be stabilized as rapidly as practicable on a metallic base, defined and fixed by statute, with the use therein of silver complementary to gold. We oppose what is commonly known as "managed currency." We urge that our Government undertake the stabilization of external exchange on a similar basis through international agreement.

GOVERNMENT IN BUSINESS

The combination of capital, intelligent management and efficient labor furnishes the most effective means by which commodities are produced and services rendered to our people. Back of this is the incentive of profit, without which business cannot be efficiently conducted. The function of Government is to insure that in the production of commodities and the rendering of services the interests of all of our people shall be properly conserved and protected. Government, by its very nature, cannot conduct business efficiently; its invasion of business destroys individual enterprise, injures all citizens by unfair competition, and dries up the source from which its revenue is derived. We condemn and oppose such invasion.

LABOR

We reaffirm the position taken by The American Mining Congress in resolutions adopted on December 14, 1934, with relation to labor as follows:

"We believe that labor is entitled to the highest wages that industry can pay. The amount which can be paid to labor is measured by the income less necessary deduction for maintenance and extension of production facilities, for the payment of taxes, for the finding and development of ore to replace that which is used up in the course of operations, and for a return

on the capital invested in amount necessary to retain it in the industry and attract new capital when needed. We believe, therefore, that the establishment of wage levels by legislation or fiat of governmental authority is contrary to sound economic principle, and is opposed to economic recovery. Wages are paid from income and income is not created by law, but only through production of goods.

"Inasmuch as eight hours is an entirely reasonable daily work period and inasmuch as the work or shift cycle in practically all mines and in most other lines of industry has been built up and adjusted to such work day, and as any reduction in the number of daily work hours will work untold hardship upon the mining industries as well as upon those who labor in mines, we strongly urge that there be no attempt to shorten the working day by law.

"We oppose specifically any legislative proposal to shorten the working day, and to restrict working time to 30 hours per week."

We condemn the attempt on the part of Congress to set up an outside political body to intervene between employers and employees in their industrial relations.

RELIEF

We favor direct relief at subsistence rates rather than work relief administered by Federal agencies. We favor the discontinuance at the earliest possible date of public relief on the part of the Federal Government, and the return of the relief problem to local agencies which can best determine those for whom relief is indispensable.

The real solution of the relief problem will come only through re-employment in private enterprise, and Government should not do anything to hinder this solution. Pending the complete discontinuance of Federal relief, the policy of the Government on work relief projects, and on direct relief, should be such as to preserve and stimulate the incentive to secure private employment.

Any system which encourages individuals to depend for their security and well being upon the state instead of upon their own initiative will inevitably create a situation where liberty for the individual will no longer exist.

THE PATMAN PRICE DIFFERENTIAL BILL

We oppose the policies contained in this bill, and believe that their application to business generally would bring about greater evils than those which the bill is designed to eliminate.

UNITED STATES BUREAU OF MINES UNITED STATES GEOLOGICAL SURVEY

We express our appreciation of the valuable work performed by these agencies in the technical, scientific and safety fields. Such services are of the greatest value to the mineral industry of this country.

RECIPROCAL TRADE AGREEMENTS

We urge that no changes in existing tariff rates on minerals and mineral products through reciprocal trade agreements with foreign countries be made without advance notice to the mineral industry. Such notice should enumerate the products contemplated to be included in any agreements, and a full hearing should be afforded to those interested.

THE METAL MINING CONVENTION

THE annual meeting of the Metal Mining Section of The American Mining Congress, held at the Palmer House, Chicago, Ill., September 23 to 27, inclusive, presented a most outstanding program. The speakers were of national and international importance, the topics were timely and presented one of the most interesting forums on mining problems ever presented before a mining convention. The men attending represented the real leadership and thought of the metal mining industries. The convention was a distinct credit to those who worked so diligently for its success, and special commendation must be given to E. A. Hamilton, general manager, U. S. Smelting Refining and Mining Company, who served as National Chairman of the Western Division of The American Mining Congress, under whose auspices the convention was held. William B. Daly, manager of mines, Anaconda Copper Mining Company, who served as chairman of the program committee, and the 88 members of his committee deserve the highest praise for the type of program which they presented for the industry's consideration. The entire committee cooperated to the fullest extent in the development of the convention.

The convention brought together many important mining men from every producing district and, while the attendance was smaller than at the 1934 meeting, representatives were present from the Lake Superior iron and copper ranges, the Mississippi Valley lead and zinc fields, the Wisconsin lead and zinc district and from Arizona, Colorado, Utah, California, Montana, Nevada, New Mexico, Idaho, Washington, South Dakota, Texas, Oregon, Iowa, Wyoming, Tennessee, Indiana, Illinois, Canada and South America. Numerous representatives from the eastern offices of the big producers also were present. Practically every important producing company in the iron, copper, lead, zinc, gold and silver industries was represented.

However, the convention was something more than a register of "Who's Who in Metal Mining." It was definitely a convention with a purpose and that purpose was the betterment of the metal mining industries, the fostering of their interests, and the development of a constructive, united program. The net result of any convention is its resolutions. The text of the resolutions adopted by this convention will be found in this issue of *THE MINING CONGRESS JOURNAL*. They deal with such important public questions as constitutional government; bureaucracy; balancing the budget; taxation; money; government in business; labor; relief; Patman price differential bill and reciprocal trade agreements.

The local committee on arrangements

handled all of the matters before it in the most efficient and helpful manner. From the reception committee, who welcomed the delegates as they registered, to the final handshake, the spirit of hospitality and friendliness was everywhere in evidence. Wilmer H. Cordes served as chairman of the welcoming committee; David A. Gubbins was chairman of the entertainment committee; F. O. Case was chairman of the special trips committee; and Alfred Kauffmann served as chairman of the publicity committee. A most charming and gracious hostess, Mrs. H. J. Saladin, with a committee of seven assisting members, made the stay of the visiting ladies most delightful.

The annual dinner proved to be a high light of the convention. Clarence B. Randall, vice president of the Inland Steel Company, presided as toastmaster, and a list of those introduced by him is an indication of the character of the men who attended the convention. They are as follows:

Howard I. Young, president, American Zinc Lead & Smelting Company; E. A. Hamilton, general manager, U. S. Smelting Refining & Mining Company; Wm. B. Daly, manager of mines, Anaconda Copper Mining Company; Hon. John W. Finch, director, U. S. Bureau of Mines; C. F. Biggert, president, Wisconsin Steel Company, and joint chairman of the dinner committee; Guy N. Bjorge, assistant general manager, Homestake Mining Company; Hon. A. Scott Thompson, Miami, Okla.; Carl Zapffe, manager of iron ore properties, Northern Pacific Railway Company; D. D. Moffat, vice president, Utah Copper Company; Donald A. Callahan, president, Callahan Zinc-Lead Company; A. E. Bendelari, president, The Eagle-Picher Lead Company; Ross D. Leisk, vice president, United Verde Extension Copper Mining Company; Ira L. Wright, manager, Black Hawk Consolidated Mines Company; Lewis W. Douglas, former Director of the Budget; R. C. Allen, vice president, Oglebay, Norton & Co.; S. L. Mather, vice president, The Cleveland-Cliffs Iron Company; Erle V. Daveeler, treasurer, Nevada Consolidated Copper Corporation; Henry S. Beal, president, Sullivan Machinery Company, and joint chairman of the dinner committee; H. E. Treichler, general manager, Texas Gulf Sulphur Company; O. M. Schaus, general superintendent, Montreal Mining Company; A. E. Petermann, vice president, Calumet & Hecla Consolidated Copper Company; Harry Vivian, chief mining engineer, Calumet & Hecla Consolidated Copper Company; Robert S.

Palmer, secretary, Colorado Chapter, The American Mining Congress, whose invitation to the Mining Congress to meet in Colorado next year had been accepted by the Western Division; and Julian D. Conover, secretary, The American Mining Congress.

The convention opened on Monday morning, September 23, with E. A. Hamilton presiding, with the motion picture "The Story of Alloy Steel." The session was devoted quite largely to a discussion of new things in the metal mining industry and particularly new markets for minerals. "New Uses for Lead" was presented by F. E. Wormser, secretary of the Lead Industries Association; "New Markets and Uses for Zinc" was presented by Russell B. Paul, of the New Jersey Zinc Company; a paper on "New Uses for Copper," prepared by B. B. Caddle, secretary of the Copper and Brass Research Association, was presented; and Edward L. Sweeney, consulting engineer, of Denver, Colo., presented an interesting paper on "Recent Trend in Design and Construction of Gold and Silver Mills." "The Story of Sulphur," a motion picture, ended the session. Many of these papers will appear in part or in full in coming issues of *THE MINING CONGRESS JOURNAL*.

At this opening session President Howard I. Young announced the selection of the resolutions committee. Men serving in this capacity were as follows:

ARIZONA.—Ross D. Leisk, vice president, United Verde Extension Mining Company, Jerome, Ariz.

CALIFORNIA.—W. Val DeCamp, general manager, Cardinal Gold Mining Company, Bishop, Calif.

COLORADO.—Robt. S. Palmer, secretary, Colorado Chapter, The American Mining Congress, Denver, Colo.

IDAHO.—D. A. Callahan, president, Callahan Zinc-Lead Company, Wallace, Idaho.

MICHIGAN.—A. E. Petermann, vice president, Calumet & Hecla Consolidated Copper Company, Calumet, Mich.; S. L. Elliott, manager, mining department, The Cleveland-Cliffs Iron Company, Ishpeming, Mich.

MINNESOTA.—W. P. Chinn, general manager, Pickands Mather & Company, Duluth, Minn.

MONTANA.—Wm. B. Daly, manager of mines, Anaconda Copper Mining Company, Butte, Mont.

NEVADA.—Henry M. Rives, secretary, Nevada Mine Operators' Association, Reno, Nev.

NEW MEXICO.—Ira L. Wright, manager, Black Hawk Consolidated Mines Company, Silver City, New Mexico.



F. H. BROWNELL



HON. LEWIS W. DOUGLAS



EDWIN E. WITTE

SOUTH DAKOTA.—Guy N. Bjorge, assistant general manager, Homestake Mining Company, Lead, S. Dak.

TEXAS.—H. E. Treichler, general manager, Texas Gulf Sulphur Company, Newgulf, Tex.

OKLAHOMA, KANSAS, MISSOURI.—Judge A. Scott Thompson, Miami, Okla. M. D. Harbaugh, secretary, Tri-State Zinc & Lead Ore Producers' Association, Miami, Okla.

UTAH.—A. G. Mackenzie, secretary, Utah Chapter, The American Mining Congress, Salt Lake City, Utah.

WASHINGTON.—Lewis P. Larsen, president, Pend Oreille Mines and Metals Company, Metalline Falls, Wash.

WISCONSIN.—W. N. Smith, general manager, Vinegar Hill Zinc Company, Platteville, Wis.

Members-at-Large.—R. C. Allen, vice president, Oglebay, Norton & Company, Cleveland, Ohio; Erle V. Daveeler, treasurer, Nevada Cons. Copper Corporation, New York, N. Y.; Howard Huston, assistant to president, American Cyanamid Company, New York, N. Y.; H. L. Pierce, secretary-treasurer, ore mining companies, M. A. Hanna Company, Cleveland, Ohio.

Ex-Officio Members.—E. A. Hamilton, general manager, U. S. Smelting Refining & Mining Company, Salt Lake City, Utah; Howard I. Young, president, American Zinc, Lead & Smelting Company, St. Louis, Mo.; Julian D. Conover, secretary, The American Mining Congress, Washington, D. C.

Julian D. Conover, secretary of The American Mining Congress, presided at the luncheon on Monday noon, at which Mr. Young, Mr. Hamilton, and Mr. Daly were formally presented to the convention. Col. Willard T. Chevalier, vice president of the McGraw-Hill Publishing Company, Inc., delivered a stirring address upon "Industry's Responsibility to its Government, its Employes, its Stockholders," pointing out that industry is government and government is industry, and that industry as we know it has had its major developments in the last 50 years. Colonel Chevalier insisted that: "Industry's responsibility to its government is neither more nor less than the



CLARENCE B. RANDALL



H. C. JACKSON

citizen's responsibility to his government. Only in proportion as industry is productive, and efficiently productive, is it possible for the great masses of the people to enjoy higher standards of living. You cannot raise and maintain the standard of living by legislative enactment or executive order; you can do it only by increasing the capacity of the people to produce wealth of one form or another. * * * We can create an abundance for all only by first creating abundance. Too many of the schemes now proposed forget that fact and invoke methods that may well check the creation of the abundance itself. We are in a bad fix when we try to divide a whole lot of what we don't have and that seems to be the trend of much thinking today." Colonel Chevalier thought that the rapid growth of industry and the complex interdependence of various agencies make it obligatory for government to assume certain regulatory services. He advocated just and sensible taxation and a cooperative spirit of all citizens toward sound government. He outlined 11 major tenets to guide government in its relation with industry. These are as follows:

1. Don't compete in business with your own citizens.
2. Don't squander or mortgage excessively the resources of the nation.
3. Remember that you are riding on the backs of the producers of the land, and if you break their backs you fall to destruction.
4. Don't forget that in our economy those producers are of three varieties:
 - a. those who work with their hands.
 - b. those who work with their heads.
 - c. those who work with their savings.
5. Don't forget that if we are to maintain our present form of government and economy each of these groups must have an incentive to carry on.
6. Remember that government by its policies of industrial regulation and taxation can weaken or destroy these incentives and that this will be the surest method to destroy the existing order.
7. See that finance is kept in its legitimate position as the servant of productive industry and that it is not perverted to be the tool of speculative manipulation.
8. When you intervene between employer and employee be sure that your intervention is fair and that the power of government is not being used to foster racketeering at the expense of legitimate and straight dealing employees.
9. Don't fuss too much about symptoms; the resources, the genius and the energy of this country are sufficient to



ELLSWORTH C. ALVORD

carry us through to greater heights than ever if we can but proceed with confidence.

10. Remember that most of your problems won't be problems once we can get away to a good start.

11. Don't try to tear down and rebuild in four years or even eight what it has taken so long to build. The human mind doesn't work that way, and the more you rattle it the worse it balks.

Clarence B. Randall, vice president of the Inland Steel Company, presided at the Monday afternoon session when addresses were made by the Honorable John Wellington Finch, Director of the United States Bureau of Mines; Dr. C. K. Leith, vice chairman of the planning committee for mineral policy, National Resources Board; and Frank E. Gannett, president of Gannett Publications. Dr. Finch's address on "The Age of Mineral Utilization" appears in this issue of THE MINING CONGRESS JOURNAL.

The Tuesday morning session, September 24, was presided over by Erle V. Daveeler, treasurer of the Nevada Consolidated Copper Corporation. F. H. Brownell, chairman of the American Smelting and Refining Company, presented a paper upon "The World Silver Situation." Ralph E. Flanders, president of Jones & Lamson Machine Company, presented a paper on "Machines as Servants of Society," and A. G. McGregor, of London, England, presented "The Correct Economy for the Machine Age." Robert E. Tally prepared a paper on "The Problems of Stabilization" which was presented at this session.

In discussing the silver situation Mr. Brownell said:

"The practical effect of the Silver Purchase Act and of the other actions is to throw the influence of the United States towards a further use of silver, either ultimate bimetallism in some form or the compulsory use of silver as well as gold if a managed currency is ultimately adopted. Confering discretion on the Secretary of the Treasury to carry out the Act 'on such terms and conditions as he may deem reasonable and most advanta-

geous to the public interest' indicates that Congress had in mind that the Secretary should so carry out the terms of the Act as to further, rather than to hinder, the ultimate use of silver as well as gold by the world when currencies are restabilized. Congress would not have embarked on the policy of buying so much silver, by far the greater part of which must come from outside the United States, if it had not believed that this would ultimately influence other nations to follow a similar course. It could not have contemplated that the Act should be so enforced as to induce other nations to melt their silver currencies and sell the resultant silver to the United States. This, obviously, would leave the United States the holder of most of the silver now owned by other nations and would hurt, rather than help from every standpoint. * * * In the United States, the present fundamental object is to bring about reemployment and to reduce the enormous expense to which the Govern-

not the Government pay a higher price for silver, which helps lead, copper, and zinc mines, as well as silver mines, in order to offer work, in order to support mining communities, in order to prevent all the evils which come from a lessening of our mining activity? Careful consideration of this subject should convince any reasonable man that the present price, and even a higher price, for United States newly mined silver is full justified.

"In conclusion, perhaps a few words as to the long run prospect of silver is in order. Should the Treasury Department retain its present policy in regard to the purchase of foreign silver and its present policy in regard to the purchase of United States silver, we can, unless unexpected conditions arise, reasonably anticipate pretty steady price levels for silver for the next several years. But the long run status of silver will be dependent upon its enlarged use as money when world monetary systems are stabilized. The experience of the last few years has demonstrated that the quantity of gold is insufficient to reestablish it as the only monetary metal, not to mention the serious problems connected with the maldistribution of such stores of gold as are already in existence. The present tendency of probability is increasingly towards a greater use of silver for monetary purposes. The long run future of silver is brighter and more promising today than at any time within the last 15 years."

At the Tuesday afternoon session the presiding officer was W. Val deCamp, general manager of the Cardinal Gold Mining Company. This session was devoted to the promotion of safety in mining production, developments in detachable bits and the use of modern explosives. These papers are scheduled to appear in THE MINING CONGRESS JOURNAL. William B. Daly presided at the Wednesday morning session, when one of the chief topics of discussion was "The Significance of Silicosis in Mining." At this session also three papers were presented upon geology, ore treatment and iron ore beneficiation in the Lake Superior



DR. C. K. LEITH

ment is put to support those who are unable to secure work. The higher price of silver has enabled many a mine to operate which could not otherwise have done so, and so has prevented many a mining community from becoming a Government charge. It has been, directly and indirectly, an important factor in such business activity as the Rocky Mountain States of this country have experienced of late. The Government is at present paying for newly mined United States silver, 77 cents per ounce. It is making a seigniorage profit of about 52 cents per ounce less minting cost, since its money value when coined is \$1.29 per ounce. This profit can be said to be available for general Government purposes, including its unemployment relief. In the industrial centers of the country, the Government is spending large sums to promote work and to bring about enlarged activity of industries. In agricultural sections, the Government is spending large sums to raise the price of agricultural products. Why should



HARPER SIBLEY

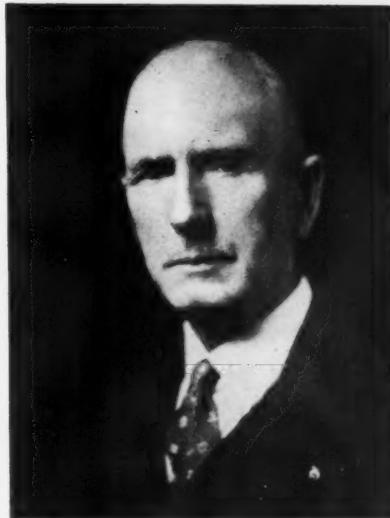
District. Dr. D. E. Cummings of the Saranac Laboratory and H. M. Lavender and G. B. Lyman of the Phelps Dodge Corporation presented the papers upon Silicosis. Stephen Royce, geologist, Carl Zapffe of the Northern Pacific Railway Company and E. W. Davis of the University of Minnesota, presented the papers on iron ore.

The luncheon meeting on Wednesday noon was devoted to a discussion of industrial relations in the Tri-State District. M. D. Harbaugh, secretary of the Tri-State Zinc and Lead Ore Producers Association, presented a most interesting paper, giving the history, wages, employees' benefits, laws, and the effect of the depression in the Tri-State District. He summarized present living conditions, local relief work, labor organizations in the field, and the attitude of employers generally toward their workmen. In conclusion he said, "What the future holds for this mining district no one knows. Doubtless there are some conditions there that need to be improved. There always are in every enterprise. With proper cooperation between employer and employee and with proper consideration for all other factors in industry most things that ought to be done probably can be done, but in any effort at reform the fundamental basis on which the industry has been developed cannot be ignored. If it is to survive and maintain a prominent place in the economic life of the country it must meet increasing competition from both mines in eastern and western states, and from ores that in general are of a much higher grade. It must not be forgotten that the value in a ton of Tri-State concentrates is mostly represented by the expenditures incurred in producing it and to a very small extent by the raw material or crude ore value. There is a very real limit to the permissible labor expense as well as to every other expense item."

Donald A. Callahan, president of the Callahan Zinc-Lead Company, presided

at the Wednesday afternoon session. Herbert C. Jackson, Pickands Mather & Company, discussed "Industry and the Social Security Program." He stated that: "If the Social Security Act in its present form remains the law of the land for many years, the ultimate effect is bound to be the socialization of industry or complete collapse through violent inflation. Before we finish with programs set up by this Act, we'll find practically everybody receiving gratuities from the Federal Government. *** We see in the Social Security Act a ticket to over 50 percent of the population of this country to participate almost at will in moneys which they did not earn and which can be made available to them only by a combination of putting the whole country rapidly in debt and by taxing themselves to some extent but mostly by taxing the balance of the country which doesn't participate in this particular grab. *** It is my opinion, however, that the perilous effect will be early apparent and compel corrective legislation."

The Honorable Lewis W. Douglas,



JESSE F. McDONALD
Newly Elected Chairman, Western Division

lion dollars, and yet there seemed to be almost no apprehension at all. And during the fiscal year 1935, just closed, we incurred a deficit of more than three and a half billions, and now we are told blithely and with a smile that the deficit for the fiscal year 1936, ending next June, will exceed four and a half billion dollars.

"I sometimes wonder whether any one living comprehends what a billion dollars is. I must confess to my own inability to appreciate what it amounts to. The only way I have been able to envision what a billion dollars is, is to try to think of the years of toil and effort by many hundreds of thousands of individuals, which must go to produce a billion dollars' worth of goods and services.

"It is not a small sum of money, and it takes almost indefinable effort to produce goods and services which command a billion dollars in the market. And yet we have already, during five years, incurred an accumulated deficit of more than 14 billions of dollars, and during six years, according to budget estimates, and the statement of the President, our accumulated deficit will approach 20 billions of dollars. ***

"For four successive years, our deficits have been greater than a 100 percent of our income, and for the fifth year it will be more than 125 per cent of our income.

"But there is another aspect of these deficits which should command attention. The amount expended for relief and public works has increased more than 600 per cent between the fiscal years 1932 and 1935, and almost 800 per cent between 1932 and the fiscal year 1936. And this, despite those who would attempt to defend the spending policy on the ground that as we have recovery, relief and public works expenditures will be diminished. We have had something of



JOHN M. CARMODY

former Budget Director for the Administration, more recently vice president of the American Cyanamid Company, delivered an address on "The Government Spending of the Taxpayer's Money." Mr. Douglas said in part:

"I am amazed, sometimes, at the extent to which human minds lose their sense of proportion and become accommodating, temporarily at least, to things which are essentially bad. This matter of spending policy brings that amazement home to me, just as the period from '27 and '28 to '29 created the same amazement.

"During the fiscal year 1932, we experienced a deficit of over three billions of dollars, and yet there was not quite so much apprehension then as there was in the previous year. In 1933, we experienced another deficit, of more than three billion dollars, and yet it was only a few weeks later that we embarked gleefully upon a policy of great spending. In 1934, we experienced a deficit of almost four bil-



JUDGE JAMES A. EMERY



View of Exposition Hall

a recovery, and yet relief and public works expenditures have been constantly increasing.

"More than that, the expenditures on public works have been continued, despite past experience with them. There is nothing new about public works. President Hoover tried them during the fiscal year 1933. He expended almost 500 million dollars. And the total amount of employment, direct and indirect, which was granted, was less than 300,000 men. In spite of that experience, confirmed by Great Britain's, France's, and every other country's which under a

profit system has attempted public works as a method for relieving unemployment, the present administration continued in the same path, and as the result of an expenditure of two and a half billions for a period of three years on public works, the total employment, direct and indirect, will not exceed 700,000 men.

"There is another aspect of this spending policy which deserves attention and that is the matter of relief. I do not know how to explain what I am going to say. I will merely give you the facts. There are approximately 20 million people on

relief. Of that number, eight millions are in agricultural and rural communities, where the unemployment problem is the least; and four millions, out of a total negro population of approximately 11 millions, are negroes. I do not know how to explain those figures. The only explanation that I can make is that the figures themselves evidence an irresponsible administration of public moneys for the purpose of preventing starvation. * * *

"No government can destroy its currency without inflicting such pain, such suffering, such poverty upon its

people, that profound social and economic changes follow in its wake.

"Don't be beguiled into the belief that we are immune from any such catastrophe. Other countries in history have been relatively as rich as we are. Other countries have pursued the same course, and yet the end has been the same. There are some, however, who say that we are too wealthy, that our per capita tax is but a fraction of the per capita tax in Great Britain. The facts are that our per capita tax in the United States is \$79, while in Great Britain it is \$91. Then



Views of Mineral States Exhibits

there are others who say that our per capita debt is so much less in this country, that we can stand the same per capita debt that they have in Great Britain, assuming that the vested interests created by spending can easily be divested. Is there any experience to confirm that assumption?

"Therefore, I conclude that unless the budget of the United States Government is speedily brought into balance, and other measures are taken to prevent a violent credit inflation, the base for which has been created to the very brim and flowing over, which if it starts will do what Josiah Stamp said it would do, blow the roof off the world—unless the budget is brought into balance, and the steps taken requiring terrific courage to prevent another violent credit inflation, I see no reason to believe that we won't experience something approaching a dictatorship and a socialist regime. * * *

"It is because of this condition that we find this peculiar picture of an apparent recovery, and yet a constant number of unemployed. It is because of this condition that we find the

unemployed concentrated in the capital goods industries, in those industries that produce lead, zinc, copper, manufacturing equipment, those industries that produce iron, steel of various kinds. For those industries rest upon the use of savings, not necessarily in the production of those things, but in the consumption of them. Those industries rest upon a free capital market where they can obtain the necessary money to install transmission lines, various manufacturing equipment, with which other things can be made for consumption by the individual. Savings are not employed when they are imperilled by acts of government, and in this instance we have a whole series of acts which imperil the security of savings. It is therefore the very acts of the administration itself which are destroying the thing which the administration alleges it wants, increased employment. The very acts of the administration itself prevent the reemployment of people. When they say, 'If savings are not used for the purpose of putting people back to work we must do so-and-so,' what they are really saying is, 'we are doing these things so that men

cannot go back to work in productive private enterprise.'

"Is that the more abundant life? Don't be seduced once, but let's not permit another seduction. Don't be beguiled by the appearances of recovery, where the natural forces are strong, and we probably will experience during the course of the next few months something which looks like recovery, but don't be beguiled by it. Don't take counsel of your fears and refrain from expressing your opinion, for this, I hope, is still America, where a man can express his opinion. Insist, rather, upon those things which are necessary to make a system of private enterprise function. Insist upon a sound Federal fiscal policy, for that is the very basis and foundation of confidence, and confidence is the very foundation of a credit system. The word credit itself comes from 'credo,' 'I believe.' And our business machine functions on credit. It is the very foundation of the stabilization of currencies. It is the very heart of a stable money. * * *

"There was a time when there would have been no gap at all, and that is the tragedy of the whole present situation. This policy of irresponsible spending has now, it seems to me as I look at the figures, made it necessary to impose taxes, not for the purpose of effecting a social and economic change in our country, but for the purpose of balancing the budget, in the amount of about 500 million dollars. And those taxes must be levied upon a broad base, somewhat similar to that which is in existence in England. * * *

"There are some who say that this is brutal and inhuman. Is it more brutal, is it more inhuman, to spend for the sake of 10 millions at the expense of 126 millions; is it more

inhuman or more brutal to spend a great people into destruction, to destroy the greatest form of government that man has ever created, or is it more human to spend only that amount which is necessary to prevent destitution, and yet to protect 126 million people? Which is the function of government, to destroy all for the sake of a few, or to protect all of its citizens?

"The answer to the whole problem rests with you. It will be decided in accordance with whether you have the character and the courage to insist that this thing be done, whether you have the character and the courage to stand upon your own feet, to resist the seductive pleas on the part of government to help you, whether you can say, 'I am a rugged individualist.'"

The Honorable James A. Emery, general counsel of the National Association of Manufacturers, discussed "Labor Combination and the Law," and Albert Mendelsohn of the Copper Range Company, presented a paper on "The Employer-Employee Relationship." Judge Emery said, in part:

"A free and self-governing people must rule or be ruled. This does not mean that men must work against their will nor be denied the right to act or quit collectively for the protection of their just interest. It does mean that such rights must be subordinated to the paramount public interest. It means that power, by whomsoever exercised, must be accompanied by corresponding legal responsibility for its use. * * * It does not mean compulsory arbitration, but it does mean that in all forms of essential public service the State or the nation may and should compel an investigation of any threatened interruption of service as a preliminary to concerted withdrawal from it. It means that coercion or intimidation by employer or employee should be recognized as equally reprehensible, that the law, which winks at lawlessness by the one party and tolerates it in the other, is as unjust as it is socially offensive. It means that, under adequate supervision, all labor organizations should be accountable to their members for the vast funds they accumulate and expend and, to the extent that their expenditure is directed toward matters affected with the public interest, that they be accountable to public agencies. * * * It means that the powers of the courts should be equally applicable, whether in the prevention of injury or in compensation for damages, to lawless combinations of either employers or employees, to corporations or labor unions. It calls for a real restoration of equality in bargaining power by making both parties to agreements equally liable for their execution. It justly requires the restoration of equality before the law by making the labor combination equally liable, with all others, for the acts of their of-



(Courtesy of General Electric Co.)

L. W. SHUGG
Director of Exhibits

ficers and agents within the scope of their employment."

The Thursday morning session, September 26, was devoted to the Revenue Act of 1935 and its effect upon the mineral industries, with a general discussion of Federal tax legislation. H. B. Fernald, of Loomis, Saffern and Fernald, served as chairman, and also presented a valuable paper on "The International Tax Problems." Other addresses were delivered by A. W. Dickinson, American Mining Congress, on "The Revenue Act of 1935"; by Ellsworth C. Alvord, attorney at law and counsel for The American Mining Congress, on "Problems of Federal Taxation"; by Fred H. Clausen, president, Van Brunt Mfg. Co., on "The Concern of Business About Taxation," and by Ross D. Leisk, vice president, United Verde Extension Mining Company, on "The Cost of Government and the Value of Property."

Silas H. Strawn, Chicago attorney and former president of the United States Chamber of Commerce, discussed the interesting subject of "The Fallacy of Higher Wages, Shorter Hours and Increased Taxation as the Basis of Prosperity." This paper was presented at the noon luncheon on Thursday.

The Thursday afternoon session was presided over by A. G. Mackenzie, secretary of the Utah Chapter of The American Mining Congress, when the general topic was the present legislative situation with particular reference to the Wagner Labor Relations Act, social legislation and the 30-hour week proposals. This discussion was participated in informally by John Michael Carmody of the National Labor Relations Board, E. E. Witte of the Social Security Board, J. B. Putnam of Pickands Mather & Company, and D. A. Callahan of the Callahan Zinc-Lead Company. Julian D. Conover, secretary of The American Mining Congress, opened the discussion which followed an address by Harper Sibley, president of the Chamber of Commerce of the United States, on "Federal Industrial Legislation."

A major feature of the convention was the exposition of mining machinery and equipment. This exposition was the sec-

ond to be held under the auspices of the Western Division. It was participated in by some 60 nationally known manufacturers who presented their products either through their actual machinery or through working models or photographs. Supplementing the machinery exhibit was the mineral states exhibit, participated in by Colorado, Illinois, the Iron Ore group, the Tri-State group, Utah, Texas and Montana. The exhibitors' committee was comprised of E. E. Littler, Anaconda Copper Mining Co.; R. E. McCormack, The Eagle-Picher Lead Co., and C. T. Millice, American Zinc, Lead & Smelting Company. The General Electric Company again loaned the services of its L. W. Shugg, nationally known exposition expert, to serve as honorary director of exhibits and this permitted the organization to give its usual high performance in the handling of the exposition. A list of those participating in the exhibit is as follows:

Allen-Sherman-Hoff Co., Allis Chalmers Mfg. Co., American Manganese Steel Co., American Sheet & Tin Plate Co., American Steel & Wire Co., Atlas Lumnite Cement Co., Atlas Powder Co., Automatic Reclosing Circuit Breaker Co., Carnegie Steel Co., Crane Co., Crucible Steel Co of America, Dings Magnetic Separator Co., Dorr Co., Inc., E. I. du Pont de Nemours & Co., Thomas A. Edison, Inc.; Fairbanks, Morse & Co.; Gardner-Denver Co., General Electric Co., Goodman Mfg. Co., Hercules Powder Co., Illinois Steel Co., Ingersoll-Rand Co., Jeffrey Mfg. Co., Justrite Mfg. Co., Knox Mfg. Co., A. Leschen & Sons Rope Co., Link-Belt Co., Macwhyte Co., Mancha Storage Battery Locomotive Co., Marion Steam Shovel Co., McGraw-Hill Publishing Co., Mine Safety Appliances Co., Mining Congress Journal, National Malleable & Steel Castings Co., National Tube Co., Nordberg Manufacturing Co., Ohio Brass Co., Oliver United Filters, Inc.; Pettibone Mulliken Co., Philadelphia Steel & Iron Co.; Portable Lamp & Equipment Co., Republic Steel Corp., John A. Roebling's Sons Co., St. Louis Power Shovel Co., Sanford-Day Iron Works, Inc.; Sauerman Brothers, Scully Steel Products, Standard Oil Co., Sullivan Machinery Co., Texas Co., Timken Roller Bearing Co., Union Carbide Co., U. S. Bureau of Mines, U. S. Steel Corp., West Virginia Rail Co., Ziv Steel & Wire Co.

As a whole the convention was an outstanding success. Certainly it offers concrete evidence that industry is striving to rehabilitate itself with a minimum of governmental aid and with a maximum of individual and cooperative action. The meeting presages a real campaign looking to a better understanding of the importance of the mineral industries and a sympathetic attitude toward their problems.

The Western Division decided unanimously to hold the 1936 Metal Mining Convention in Denver, Colo., and elected ex-Governor Jesse F. McDonald, manager of the Downtown Mines Company, of Leadville, and one of the best known of Western mining men, as chairman for the coming year.

PERSONALS

Dr. Henry Andrew Buehler, president of the American Institute of Mining and Metallurgical Engineers, and director of the Missouri Bureau of Geology and Mining, is now on his first official tour of the western states. He is accompanied by A. B. Parsons, secretary of the Institute. Dr. Buehler was extensively entertained and honored by the mining men of Utah upon his arrival in Salt Lake City on September 23.

J. P. Distler has been appointed manager of sales of the wire division, Republic Steel Corporation, with headquarters at the Grand Crossing plant in Chicago, Ill.

Among prominent coal men who were present at the Metal Mining Convention and Exposition of the American Mining Congress in Chicago, the week of September 23, were Eugene McAuliffe, president, Union Pacific Coal Co.; Paul Weir, vice president, Bell & Zoller Coal and Mining Company; W. J. Jenkins, president, Consolidated Coal Company of St. Louis; and T. J. Thomas, president, Valier Coal Company.

W. B. Gohring, former secretary of the Arizona Chapter of the American Mining Congress, has been appointed to represent the Mine Loan Division of the RFC in Arizona.

William Wearne voluntarily retired as general superintendent of iron ore properties of the Inland Steel Company, at Duluth, Minn., on September 1, to take up his residence in San Diego, Calif. Since 1906 all of the developments of the company with respect to iron mining have taken place under Mr. Wearne's supervision.

Hon. Chester Thompson, Rock Island, Ill., a member of the House Ways and Means Committee, attended the Chicago meeting of the American Mining Congress.

F. H. Brownell, chairman, American Smelting and Refining Company, and **Lewis W. Douglas**, vice president, American Cyanamid Company and former Director of the Budget, were two of the keynote speakers at the Metal Mining Convention of the American Mining Congress, in Chicago, Ill., the week of September 23. Other prominent speakers were **Dr. C. K. Leith**, vice chairman of the planning committee for mineral policy, National Resources Board; **Hon. John Wellington Finch**, director of the U. S. Bureau of Mines, whose address is carried in this issue; **Harper Sibley**, president of the Chamber of Commerce of the United States; **John Michael Carmany**, representing the National Labor Relations Board; **Edwin E. Witte**, advisor to the Social Security Board; **Colonel Willard T. Chevalier**, vice president, McGraw-Hill Publishing Co., Inc.;

Silas H. Strawn, noted Chicago attorney; and **Judge James A. Emery**, general counsel of the National Association of Manufacturers.

Benjamin F. Fairless, formerly of the Republic Steel Corporation, has been appointed president of the new steel merger of the United States Steel Corporation, being a unification of the corporation's two largest subsidiaries — Carnegie of Pittsburgh and Illinois of Chicago. **G. Cook Kimball** has been appointed vice president in charge of Chicago operations of the Illinois Steel Company under this new set-up.

Mr. K. A. Lindner, formerly connected with American Smelting and Refining Company, has been transferred to their Baltimore plant and should be addressed as follows: **K. A. Lindner**, Manager, Baltimore Copper Smelting & Rolling Co., Highland and Eastbourne Aves., Baltimore, Md.



RALPH E. TAGGART

Announcement has just been received that **Mr. Ralph E. Taggart** has been elected president of the Philadelphia & Reading Coal & Iron Corp., also president of the Philadelphia & Reading Coal & Iron Co., and a director in both concerns.

Mr. Taggart is one of the best known coal operating men in the country having served during the formation of the Bituminous Coal Code as one of the four men chosen to represent the industry. He has been for several years vice president in charge of operations of the Stonega Coke & Coal Company of Virginia and its affiliated company, The Westmoreland Coal Company, of Pennsylvania.

M. C. Lake, consulting geologist, Duluth, Minn., has recently completed a mine examination trip in the Pacific coast states.

Hon. Charles West, Under Secretary of the Interior, who was scheduled to address the Chicago meeting of the American Mining Congress on September 23, was unable to do so, much to his regret. He was called to Hyde Park and returned to Washington with President Roosevelt.

Robert S. Palmer, secretary, Colorado Chapter of the American Mining Congress, stopped at the Washington office of the organization, en route by automobile to his home in Denver, from the Chicago Convention, where he effectively displayed the multiplicity and importance of his state's mineral resources.

G. H. Jones, president, Hillside Fluor Spar Mines Company, Chicago, Ill., is recuperating from an emergency operation which he underwent the week of September 23.

R. E. Salvati has been officially appointed general manager of the Island Creek Coal Company, with general offices at Holden, W. Va. He will continue as vice president and general manager of the Pond Creek Pocahontas Company.

W. Val DeCamp, general manager of the Cardinal Gold Mining Company, Bishop, Calif., was reelected president of the Inyo-Mono Mining Association at its regional conference on August 31.

T. H. O'Brien, general manager, Inspiration Consolidated Copper Company, Inspiration, Ariz., was unable to participate as scheduled in the Chicago meeting of the Mining Congress because of the resumption of operations by Inspiration after a shut-down of several years.

McHenry Mosier, formerly with the Phelps Dodge Corporation in Arizona, is now with the United States Bureau of Mines as senior mining engineer.

James F. Callbreath, secretary emeritus of the American Mining Congress, who has been confined to the hospital for the past few weeks, is now convalescing.

Among recent visitors to the Washington offices of the American Mining Congress were **Dr. H. Foster Bain**, consulting engineer, New York; **Herbert Wilson Smith**, of the Union Carbide Corporation; **F. L. Stone**, of the General Electric Company, Schenectady, N. Y.; **W. E. E. Koeppler**, secretary, Pocahontas Operators' Association, Bluefield, W. Va.; **Henry O'Bleness**, of the Berwind-White Coal Mining Company; and **W. D. Lynch**, of the Phelps Dodge Corporation.

R. S. Archer, metallurgist, Republic Steel Corporation, was elected president of the American Society for Metals, at their annual meeting in Chicago, October 2.

E. D. Bransome has been elected president of the Vanadium Corporation of America, succeeding **Alfred A. Cory, Jr.**, who resigned the presidency at a recent board meeting of the company. **Dr. B. D. Saklotwalla** also resigned as vice president and director of Vanadium, and will devote his efforts in the formation of a new organization for research and development, especially in connection with new steels and alloys.

James M. Landis has assumed his duties as head of the Securities and Exchange Commission, succeeding **Joseph P. Kennedy**, whose resignation as chairman and a member of the Commission took effect September 23.

Among important speakers at the annual meeting of the American Bituminous Retailers Association, held in Chicago the week of September 30, were **Hubert E. Howard**, president, Binkley Coal Company; **Howard N. Eavenson**, president, Clover Splint Coal Company; **W. E. E. Koeppler**, secretary, Pocahontas Operators' Association; and **Carroll B. Huntress**, president, Appalachian Coals, Inc. **Geo. H. Harrington**, president, Chicago, Wilmington & Franklin Coal Company, presided as toastmaster at the annual dinner on September 30.

Dr. Zay Jeffries, of Cleveland, and consulting metallurgist for several large companies, was awarded the Albert Sauveur Achievement Medal at the annual meeting of the National Metal Congress in Chicago, October 3. The Henry Marion Howe Medal, awarded to the author or authors of the best paper during 1935, was presented to **T. D. Yensen**, of the Westinghouse Elec. & Mfg. Company, and **R. J. Z. Legler**, of the West Penn Steel Company, on magnetic properties of certain grades of steel.

John R. Hicks has retired from the firm of Eavenson, Alford & Hicks, mining engineers, Koppers Building, Pittsburgh, as of September 30, 1935. Effective that date the firm name has been changed to Eavenson & Alford, same address.

Inland Steel Company has announced the appointments of **R. L. Wahl** as general superintendent of Iron Ore Mines; **R. D. Satterley** as superintendent of Morris Mine, and **F. A. Olson** as superintendent of Greenwood Mine. All of these men are located at Ishpeming, Mich.

NO RULES IN THIS GAME



—Chicago Daily Tribune.

R. L. Wahl came with Inland Steel Company in 1913 at the time when the Armour Mines were taken over on the Cuyuna Range. He was a graduate of the Michigan College of Mines and had previously been employed by Rogers Brown Ore Company. Having been for several years past the assistant general superintendent of the company's mining operations, he is entirely familiar with all of its problems, and unusually well qualified to succeed Mr. William Wearne, who retired voluntarily as general superintendent on September 1.

R. D. Satterley graduated from Michigan College of Mines in June, 1925, and entered the company's engineering department on August 15 of that year. He was in charge of sinking the shaft at the company's Greenwood Mine and of the opening and development of that new property. He is, however, entirely familiar with the operation at the Morris Mine and will take over his new duties without difficulty.

F. A. Olson came with the company as its first safety director in 1926, having previously been employed in the engineering department of the Cleveland-Cliffs Iron Company. He was also in charge of the diamond drilling at the Greenwood Mine when that property was first prospected and has since that time kept continuously in touch with its conditions. He will continue to serve as the safety director at all of the mines.

On October 3 a reception-banquet was tendered by the citizens of the Michigan copper country to the new president of the Michigan College of Mining and Technology, **Grover C. Dillman**. Speakers included **A. E. Petermann**, chairman of the Board of Control of the College and vice president of the Calumet & Hecla Consolidated Copper Company. Dr. **James Fisher**, of the College faculty, and other leading citizens. Mr. Peter-

man, who delivered the principal address, said: "For 40 years Michigan Tech was purely a mining college, teaching only mining and metallurgy. * * * These men have built up a wonderful reputation for the college, which must be maintained if it is to retain its high ranking as an education institution."

General William W. Atterbury, former head of the Pennsylvania Railroad System, died September 20, at the age of 69 years. His death brought to a close one of the most colorful careers in American railroading.

Mining Bismuth in Utah

(Continued from page 25)

after the machinery or testing operation is complete. The casting and subsequent removal of the fusible alloys can be carried out at temperatures low enough to avoid any possibility of injuring the specimen. A modified fusible alloy which is stronger and more resistant to compression than are the extremely fusible alloys, has been described recently. This "matrix" alloy is being used in the alignment, setting, and repair of punch press dies. A die can be set in position by means of this alloy more quickly and easily than by means of screws, wedges and other mechanical means, and the alloy setting is more permanent and requires less attention. The alloy can be melted with a small torch, to free to die at temperatures so low that the temper of the die is not affected.

Many of these low-melting alloys possess excellent casting properties. Pure bismuth expands about 3 percent of its volume during solidification, and it possesses a coefficient of thermal expansion of 0.03001316 for the range from 0° to 100° C. This coefficient is approximately half that for aluminum or lead. Alloys which contain appreciable amounts of bismuth do not shrink as much as do many metals during solidification nor on further cooling of the solid metal. Both of these factors are desirable in pattern making. It is possible to prepare alloys high in bismuth which do not change in volume during solidification, or which expand during solidification, but this is possible only when the bismuth content is over 50 percent. All of these alloys exhibit shrinkage of the solid metal as it cools from temperatures near the melting point to room temperature, but this coefficient of expansion of the solid metal usually is low. Low melting alloys have been used to repair defects in casting and to reproduce delicate patterns.

The Utah engineering experiment station of the University of Utah, staff members of the station and fellowship men at the present time are working on the metallurgy of bismuth ore from the Alta Champion mine, and no doubt will work out processes which will mean the saving of many thousands of dollars to the producers.

MINING EVENTS

THE five members of the new National Bituminous Coal Commission named to administer the Guffey Bituminous Coal Act have arrived in Washington and been sworn in. They are now engaged in looking for quarters for their agency.

Charles B. Hosford, who is chairman of the Commission, is a former coal operator in Pennsylvania and has been with the Western Pennsylvania Coal Association, a coal operators' group. He is a lawyer by profession. He is an old advocate of Federal regulation of the industry and supported the old Davis-Kelly bill as well as the Guffey measure. George E. Acret, of Los Angeles, is also an attorney and was a candidate for supreme court judge in that state at the last election on the Sinclair ticket. He is said to be a close friend of Senator McAdoo. C. E. Smith has been for many years editor of the Fairmount, W. Va., *Times*. Percy Tetlow is a veteran union man and for 45 years has been active in the United Mine Workers. His home is in Columbus, Ohio. Walter H. Maloney is a Kansas City, Mo., lawyer and politician.

The three members of the Coal Labor Board include Lee Gunther, of Knoxville, Tenn., who is a former coal operator in that section and is now secretary of the Southern Appalachian Coal Operators' Association. John J. O'Leary, who represents labor on the board, is from Carbondale, Pa. He started as a miner in the anthracite field but switched to bituminous many years ago, and has been active in the United Mine Workers for more than 20 years. John M. Paris is an old-time resident of New Albany, Ind., and has been a lawyer and a state circuit court judge, holding the latter post for 22 years. He has been active in civic affairs in his section of Indiana and represents the public on the coal board.

On October 9 the National Bituminous Coal Commission, created under the Bituminous Coal Convention Act of 1935, released three orders, in the first of which is embodied the promulgation of the Bituminous Coal Code, with which the producers of the country must comply as long as the Act has the status of law.

General Order No. 1 contains the "Bituminous Coal Code" which is largely made up of extracts from the Act and which is undoubtedly drawn with a view to minimizing any chance of legal action by those producers who are opposed to the law.

General Order No. 2 provides a form of acceptance planned for purpose of being signed by the producers who accept and enter into a membership in the code.

General Order No. 3 develops the details for the organization of the District

Boards, naming 23 producers representatives and setting forth information as to duties and methods for holding the elections for members of the District Boards. The order describes forms 1, 2, 3, 4, and 5, which are for acceptance, proxies, tonnage statements, etc. The official forms will be made available to the producers in the 23 districts within a very few days and will be distributed through the 23 representatives named.

The Bituminous Coal Code as promulgated contains the following: Part I, Organization and Production; Part II, Marketing; Part III, Labor Relations, and at the end the Schedule of Districts, all practically identical with the Act, the only changes being made in certain wording to mold the Act into a code.

THE total production of anthracite (which includes colliery fuel) for the week ending September 14, as estimated by the United States Bureau of Mines, amounted to 794,000 net tons. This is an increase, as compared with production of the preceding week, of 263,000 net tons, or 49.5 per cent. Production during the corresponding week in 1934 amounted to 957,000 tons.

BITUMINOUS coal production in the United States for the week ended September 21 was approximately 7,620,000 net tons. Production for the corresponding week: 1934, 6,864,000 tons; 1933, 6,744,000 tons. The report of the Bureau of Mines shows production of 6,890,000 tons for the week ended September 7, and 8,355,000 tons for the week ended September 14, 1935. Production calendar year to September 21, 1935—260,738,000 tons; 1934—255,058,000 tons.

THE twenty-eighth meeting of the West Virginia Coal Mining Institute was held October 4-5, at Beckley, W. Va., with headquarters at the Black Knight Country Club.

The following program of technical papers was presented: "Securing Teamwork of Workers with Management at Coal Mines," by Carel Robinson, general manager, Kellys Creek Collieries Company, Ward, W. Va.; "Possible Applications of Mercury Arc Rectifiers to Mine Work," by J. J. Linebaugh, General Electric Company, Schenectady, N. Y.; "Conveyor Systems of Mining at Jewell Ridge Coal Corporation and Pemberton Coal and Coke Company," by E. B. Gelalaty, manager, Jeffrey Manufacturing Company, Columbus, Ohio; "Possibilities of an Industrial Relations Program in

the Coal Industry," by Fred A. Kraft, director of employes service, Consolidation Coal Company, Fairmont, W. Va.; "Recent Developments in Explosives for Mines and Quarries," by Sam Thayer, assistant manager, technical section, E. I. duPont De Nemours & Co., Inc., Wilmington, Del.; "Difficult Heading Driving and Pumping Problems," by C. F. Carothers, general superintendent, Pond Creek Pocahontas Company, Bartley, W. Va.; "Engineering Problems on the Construction of Boulder Dam," by D. M. Simmons, chief engineer, General Cable Corporation, New York, N. Y.

THE vital need for the exercise of safe measures in coal mining and that of teaching safety and first-aid methods is emphasized in a newly revised two-reel silent motion picture film entitled, "The Making of a Safe Miner," which has been produced under the supervision of the United States Bureau of Mines, in cooperation with one of our large coal mining companies. The film is a condensed version of one previously produced entitled "When a Man's a Miner."

The "Making of a Safe Miner" includes many spectacular scenes depicting the operation of a large coal mine. The film has been given a human setting which should appeal to the mining industry, the student, and the general public. The action of the film hinges on the story of a capable but careless miner, who later becomes converted to carelessness and safety-mindedness through personal experience in a mine disaster. Subsequently, the lives of his fellow miners, who have been entombed as a result of an explosion, are saved through his leadership and knowledge of safety methods. A number of scenes show a United States Bureau of Mines rescue team in action and stress the necessity of first-aid training and mine rescue work for those engaged in the industry.

The showing of this picture in the classroom should be of special value to students taking mining courses, while it also presents a vivid picture of coal mining operations which should be of interest to the general student.

Copies of this film in 16-mm. or 35-mm. sizes are loaned for exhibition purposes, to schools, churches, clubs, civic and business organizations, and others, upon application to the Pittsburgh Experiment Station of the United States Bureau of Mines, Pittsburgh, Pa. No charge is made for the use of the film, but the exhibitor is asked to pay transportation charges.

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THE AMERICAN MINING CONGRESS

1935—1936

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Lewis P. Larsen, President, Pend Oreille Mines and Metals Co.
Dean Milnor Roberts, Prof. Mining & Metallurgy, University of Washington.

FIRST steps in the Administration move toward a possible future extension of NRA principles were taken recently when Major George L. Berry, Industrial Coordinator recently appointed by the President (see Executive Order on page 22), made public a copy of a letter he mailed to thousands of business executives and labor leaders. The letter set out the plans under discussion of voluntary fair trade practice agreements and asked for replies as to whether representatives would be willing to sit in on "round table conferences" at which plans would be formulated.

Under authority of an executive order issued by the President before he embarked on his western trip, the Federal Trade Commission is also authorized to promulgate and accept voluntary codes from industry. The President requested the Trade Commission to negotiate the voluntary codes, termed "fair trade practice agreements," which need not include labor provisions and which *will not* be exempted from the anti-trust laws as were the old NRA codes. Labor provisions of codes, on the other hand, will be handled by the NRA under the guidance of Major Berry.

Following closely upon the President's order, the NRA received from the Federal Trade Commission copies of trade practice agreements from seven industries for which NRA must approve the labor provisions. One industry, wholesale tobacco, has already received Federal Trade approval of its trade practice rules and awaits approval by the NRA of its labor agreements. Once approved by NRA and returned to Federal Trade, formal approval by the President is required. The other six industries which have forwarded labor agreements to the NRA are asbestos manufacturing, asphalt shingle and roofing manufacturing, solid braided cord, rock and slag wool, ladies' handbags manufacturing, and fertilizer. These six are now negotiating trade practice rules with the Federal Trade Commission.

CONSUMPTION of products made from copper and its alloys has been showing marked improvement this year and the outlook for 1936 is most encouraging for still further gains," Mr. F. S. Chase, president of the Copper and Brass Research Association, announced at the fourteenth annual meeting of members.

"Production of automobiles during 1935 should exceed 3,700,000 cars," he said. "That is an increase of more than 30 percent over 1934. The automobile industry is one of the largest consumers of copper and nearly 200,000,000 pounds will be consumed during the present year.

"Nearly a million pounds of copper and its alloys are used each week in the mechanical refrigeration and air conditioning industries. These industries have also shown steady gains during the present year.

"Building has been slow to get in its stride, but with the Government behind

the Better Housing Program through its Federal Housing Administration, residential building is increasing rapidly at the present time. There was greater activity in residential building during the first seven months of 1935 than during the entire year of 1934. The last quarter of this year looks excellent and we expect even better figures for 1936—and better yet for 1937. In residential building, copper is largely used for roofing, flashings, gutters and downspouts; copper and brass for water lines; solid brass and bronze for hardware and lighting fixtures and bronze for insect screen cloth. The tonnage of these metals in the building field during 1936 may well reach 175,000,000 pounds.

"Sales of giftware articles, cooking utensils and other specialty lines are increasing. Orders for the holiday season in these lines have been better than perhaps any year since the depression was first felt some six years ago."

The following officers were elected: President, F. S. Chase, president of Chase Brass & Copper Company; vice president, John A. Coe, president of the American Brass Company; vice president, C. D. Dallas, president of Revere Copper and Brass, Inc.; vice president, Wylie Brown, president of Phelps Dodge Copper Products Corporation; treasurer, C. D. Dallas, president of Revere Copper and Brass, Inc.; secretary, Bertram B. Caddle.

The following were elected members of the Executive Committee: J. A. Doucett, Revere Copper and Brass, Incorporated; R. L. Coe, Chase Brass & Copper Company; John A. Coe, Jr., The American Brass Company; W. M. Goss, Scovill Manufacturing Company; H. W. Steinkraus, Bridgeport Brass Company; Wylie Brown, Phelps Dodge Copper Products Corporation.

Operators Committees of the American Mining Congress Meet at Penn State College

THE Coal Operators Committee of the American Mining Congress had a meeting at Penn State College on October 4 and 5. Forty committee members were present, representing seven districts—Central Pennsylvania, Pittsburgh, southwestern Pennsylvania, Ohio, northern West Virginia, central West Virginia, and southern West Virginia. This meeting was in connection with the Annual Coal Conference held by the Pennsylvania State College.

At the Friday afternoon session Mr. R. G. Pfahler, of the Berwind-White Coal Mining Company, presided as chairman and the following papers were presented and discussed:

"Proposed Standard Specifications for Testing Mine Fans," by J. F. MacWilliams, Pennsylvania Coal & Coke Corp.

"Mining Systems in Central Pennsylvania," by A. E. Roberts, Monroe Coal Mining Co.

"Face Preparation Work," by A. E. Long, Clearfield Bituminous Coal Corp.

On Saturday morning the meeting of the American Mining Congress' project committees was held, with G. B. Southward, of the American Mining Congress, presiding as chairman. Each of the eight major operations of mining—face preparatory, loading, transportation, power, mine maintenance, mining systems, surface preparation, safety—is covered by a project committee which will make studies and reports on operating practices. The project chairmen at this meeting recommended the particular subjects in mine operation which should receive first attention by the various district committees throughout the United States. Following a discussion

of these recommendations, the final selection of subjects was made, and the work of gathering data and preparing full reports will be started immediately. The interest and enthusiasm of the operating men at present would indicate that a series of exceptionally valuable reports will result.

On Friday night there was an informal dinner at the Nittany Lion Inn, with Professor W. R. Chedsey, head of the Department of Mining, of Penn State College, presiding as toastmaster. Addresses were made by Dr. Edward Stidle, dean of the Penn State Engineering College, and by Mr. Maurice D. Cooper, of the Hillman Coal & Coke Co.

THE output of mercury in 1934 was 15,445 flasks from 93 mines, compared with 9,669 flasks from 75 mines in 1933. Many of the mines that contributed to production in both years produced a few flasks only and were then abandoned, and 15 properties produced 87 percent of the total output in 1934. California was, as usual, the largest producing state, contributing 51 percent of the total production, followed by Oregon with 22 percent of the total. Production, by states, for 1933 and 1934 is given in the following table:

The quoted price for mercury was comparatively steady in 1934. The monthly average price at New York was nearly \$68 a flask in January, rose to \$72 in February, \$75 in March and nearly \$76 in April, after which it declined slightly to \$75, at which level it remained for June, July and August. The price declined further in the last quarter of the year and was \$73 for December. The average price for 1934 was \$73.87, compared with \$59.23 in 1933. In 1933 the highest monthly average was \$66.50 a flask and the lowest monthly average was \$48.50.

The principal mercury-producing properties in 1934 were: Parker Property, Pike County, Arkansas. Great Western, Mirabel and Sulphur Bank mines, Lake County; Aetna and Oat Hill mines, Napa County; New Idria mine, San Benito County; Klau and Oceanic mines, San Luis Obispo County, and Cloverdale mine, Sonoma County, California. Blackbutte mine, Lane County, and Bretz mine, Malheur County, Oregon. Big Bend, Chisos and Rainbow mines in Brewster County, Texas.

According to records of the Bureau of Foreign and Domestic Commerce, imports of mercury for consumption in the United States in 1934 were 10,192 flasks, compared with 20,315 flasks in 1933, 3,886 flasks in 1932, and an average of 13,700 flasks for the ten-year period, 1924-1933. Of the quantity imported in 1934, 69 percent was from Spain, 24 percent from Mexico and the remainder from Italy and Sweden. Stocks of mercury in bonded warehouses were 4,346 flasks at the end of 1934, compared with 5,370 flasks at the beginning of the year.

TRI-STATE ZINC AND LEAD ORE PRODUCERS ASSOCIATION BULLETIN FOR WEEK ENDING SEPT. 21, 1935 (Dry Tons of 2,000 lbs.)

	Zinc concentrates			Lead concentrates		
	This week	Last week	Year ago	This week	Last week	Year ago
Total stocks (sold and unsold)	21,708	22,584	20,600	16,005	15,668	14,229
Net reserve stock	20,999	20,591	19,130	15,942	15,585	14,024
Production *	8,148	8,668	8,149	818	866	977
Shipments	9,024	10,425	6,895	481	762	1,404
Sales reported	7,740	10,330	7,729	461	645	1,442
* Included tailing mill production	2,491	2,524	1,728	—	—	—
Base price—Joplin	\$36.00	\$39.00	\$24.00	\$47.00	\$45.00	\$36.50
Metal price—average for week:						
Zinc, E. St. L.—Lead, St. L.	4.720c	4.600c	4.000c	4.265c	4.200c	3.555c

MILL STATISTICS

	This week	Last week	Year ago
Mills producing more than 25 tons:			
Mine mills operated 32 hours or more	23	23	36
Mine mills operated less than 32 hours	1	1	9
Tailing mills operated 96 hours or more	24	22	15
Tailing mills operated less than 96 hours	0	6	0
Total	48	46	51
Mills producing less than 25 tons:			
Mine mills	6	5	..
Tailing mills	4	4	..
Total	10	9	5
Total number of mills operated	58	55	56

Mine mills operated this week: Admiralty No. 2, Black Eagle, Byrd Mary Jane, Canadian, C. M. & R. Bird Dog and See Sah, Cardinal, V. H. Barr, D. & C., E. P. Central, E. W. No. 4, Interstate Woodchuck, Iron Mt., K. & O. Discard, Lavrion, Lost Trail, Little Chief, Peru, Mary M. Beck, Mission, New Blue Mound, Playter, Rialto, St. Louis No. 4 and No. 8, St. Nicholas, U. Z. Royal, Vello Dines and Lion, Blue Bonnet.

Tailing mills operated this week: Atlas; Aul; Bailey; Baxter Chat; Britt; Cardin No. 1 and No. 2; C. M. & R. Beaver, Chubb and Webber; Roadsides; Cortez; E. W. No. 7; Peru-Laclede; F. & B. Short-horn; Lawyers; Mineral Recoveries; Missouri Minerals; R. H. & G.; Robinson; Semple Early Bird and Rightly; Skelton; Mo. Chitwood; Tri-State Ottawa and Sooner; Wills; Youngman.

THE Anthracite Institute has again offered to the anthracite-burning States a relief coal program, similar to the one followed last year. This offer represents a reduction in price below circular on properly certified deliveries to welfare cases and is a very substantial contribution, tending to lower relief and welfare costs. Too much credit cannot be accorded the industry for this action.

The program has been accepted by the States of New Jersey, New York, Pennsylvania and Connecticut and has already gone into effect in some of those States, particularly New Jersey. Rhode Island and Delaware have not as yet completed their relief programs as they are dependent on WPA activities, but have indicated that they will probably participate.

In New Jersey, New York and Pennsylvania the retail associations have actively participated in the negotiations and will cooperate with their State Welfare Administrations in the detailed conduct of the program throughout the heating season. In New Jersey and New York the retail associations have been authorized by their members to specify low margins for relief deliveries as their contributions to relief, these margins being such that further savings accrue to the States. Similar contributions have been made by retailers in Connecticut and Pennsylvania, except that the margins are not uniform in these States due to unusual local conditions.

This far-sighted action on the part of the States is of the utmost importance. It not only guarantees a saving and provides the best quality of anthracite, but it also allows for relief coal distribution through regularly established trade channels. In addition, it provides a means for distribution of welfare coal that can be used as a permanent set-up and is free of political control. Of prime importance to the retailer is the assurance of a fair margin to cover his costs, and to assure his employees of continued employment throughout the winter season, thus preventing further additions to the relief rolls.

The details of the program involve the use of "Relief Coal Credit Requests" as heretofore. The "Requests" originate with the dealer and clear through proper channels to the Institute where they form the basis of advices to participating producing companies for credits to the accounts of the dealers concerned. The program will be under the direct supervision of Scott G. Lamb of the Institute as it has been in the past two years.

It is of interest to note that this program was first worked out in the State of New Jersey two years ago by Major Henry Adams, of Plainfield, Relief Administration Fuel Advisor. This coming year will be the third in which New Jersey has used the same program without change, under the very capable administration of Major Adams.

AN executive meeting of the Senate Special Silver Committee was held at Salt Lake City, Utah, October 12, with four of the five members in attendance: Senators Pittman (D., Nev.), chairman; Borah (R., Idaho), King (D., Utah), and Thomas (D., Okla.). Senator McNary (R., Ore.), the fifth member, was not present.

The meeting was called to receive government reports of the operations of the Silver Purchase Act of 1934, which were submitted to the committee by Gross-von M. Jones, of the Finance Division, Bureau of Foreign and Domestic Commerce. Members of the committee will study these reports and will then file their comments with Chairman Pittman, after which it is proposed to compile a questionnaire for submission to economic, banking, and monetary authorities in the United States and other countries, preliminary to the presentation of the committee's conclusions to Congress after it assembles in January.

It is intimated that the facts to be included in the committee's report will tend to confute statements that the silver policy has been injurious to silver-using countries and to United States trade with those countries.

Book Review

"MONEY AND ITS POWER" is the title of a small book just from the press of the National Home Library Association of Washington, D. C., prepared by F. Truman Winslow and Bruce Brougham. This small volume contains much readable, concise and practical information concerning money. The foreword is written by ex-Senator Robert L. Owen, who for many years was chairman of the United States Senate Finance Committee. In Mr. Owen's comment he states, "It advocates no particular reform in regard to the monetary system of the country, and would appear, therefore, to be entirely free from controversial matter." This particular qualification is so commendable as to command the interest of the average reader. Before the book is finished, however, the

author advocates the solution of many money problems by "joint-weight" bimetallism.

If metallic money is to again be used as a monetary medium, the plan carries much deserving recommendation. The present apparent trend toward the use of metallic money solely for the settlement of foreign trade balances seem to argue very strongly against the adoption of this proposal. "Money and Its Power" is sold by its publishers at the extremely low price of 25 cents, this being the price at which a number of other publications are sold by this publishing company. "Money and Its Power" will be found a very interesting and practical statement of the money question so written as to make it easily understandable.

AUTOMATIC REFRIGERATION TRAINING, by the Refrigeration Engineering Institute, Youngstown, Ohio, 1935; 8 by 11 inches; pages mimeographed—430 single-spaced and 143 double-spaced; 342 illustrations.

THIS compilation consists of 50 lessons in electric and gas refrigeration ranging from 7 to 16 pages each, with easily read illustrations from less than 1 inch square to a full page each. There is no table of contents nor index, presumably because each lesson is separately paged, and nobody is credited with the work. However, as a means of instruction to students, research men, and others—elementary and more or less advanced—this manual should be found of much practical use. Every phase of refrigeration is discussed—theories, definitions, mathematics, machines and parts, foods and liquids, refrigerants, compressors, condensers, valves, temperature control, plant arrangement, troubles, miscellaneous devices, cabinet construction, insulation, domestic and multiple systems, inspection and symptoms observable by service men.—M. W. von Bernewitz.

PETER F. LOFTUS

Consulting Engineers

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NEWS OF MANUFACTURERS

THE ALLIS-CHALMERS Cantilever Grizzlies, or Cantilever Bar Screens, is said to have many advantages. As the word Cantilever implies, the bars are fixed only at the head end. The absence of bar tie rods at the lower end eliminates the clogging often experienced there with ordinary types of bar screens. The impact of the material on the grizzly causes the overhung free ends of the bars to vibrate horizontally keeping the material from wedging. Thus with higher efficiency it can handle large tonnages more effectively. The Cantilever Grizzly has the advantages of simplicity, low first cost, low maintenance cost, ease of operation, ease of repairs and the fact that there are no moving parts that require power. The most common use for Cantilever Grizzlies is for separating fines from crusher feeds of various kinds. They are available with openings from 1 inch to 3 inches between bars according to individual requirements. The bars are tapered in section and made of highest quality Manganese steel to resist wear.

ANNOUNCEMENT is made by Link-Belt Company that R. Y. MacIntyre, who has served as their representative in Memphis, Tenn., since 1932, has been transferred to the company's district sales office and warehouse in

Dallas, Tex., where he will assist E. G. Wendell, the local manager.

A NEWLY patented magnetic clutch coupling insuring positive quick engagement and disengagement, with less than 1½ degrees of slip, is announced by the Dings Magnetic Separator Company, Milwaukee, Wis. This device has already found wide application on hot and cold strip mill secondary screwdown shafts, soaking pit covers and on many other applications where positive engagement and remote control are necessary or desired.

The type SCC clutch transmits unusually high torque, five times that of an ordinary friction type clutch of the same diameter and of either the single disc or multiple disc design.

MORE than 11,000,000 S K F bearings in transmission equipment are in worldwide use today, states a 32-page catalog describing ball and roller bearing transmission appliances just released by S K F Industries, Inc., Philadelphia, Pa. The book shows load ratings and diagrams of mountings for S K F ball and roller bearing pillow blocks, flanged housings, take-up boxes, post and drop hangers, floor stands, replace boxes, locknuts and lockwashers. Seven pages are devoted to a discussion of bearing problems, aids in the selection of ball

and roller bearings, and dimensional and load data. Its preface states, "A simplified system of designation for S K F power transmission equipment has been developed, involving changes in the designations or references used in previous books. These new designations will appear on products as soon as stocks having old designations are exhausted. In the new system key letters designate the type of unit, size indicated by the addition of the number for the bearing assembly."

ALLIS-CHALMERS has just issued Bulletin No. 1474-A which is a new and more complete bulletin on their line of Aero-Vibe screens. These vibrating screens, floating in the air suspended by cables and springs, are illustrated in both single and double deck types, together with their multiple V-belt drives. They are stated to be applicable to most any materials sized for commercial purposes, either wet or dry, such as crushed stone and slag, sand and gravel, coal and coke, oyster shells, fertilizers, various ores, oil well drilling, mud, and many other materials.

THE Philadelphia Sales Office of the Ajax Flexible Coupling Company has been moved to 1108 Otis Bldg., Mr. V. L. Sanderson is representative in charge.

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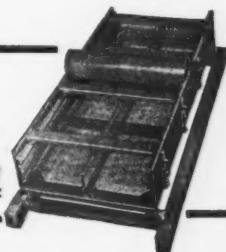
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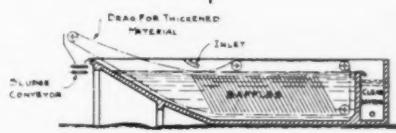
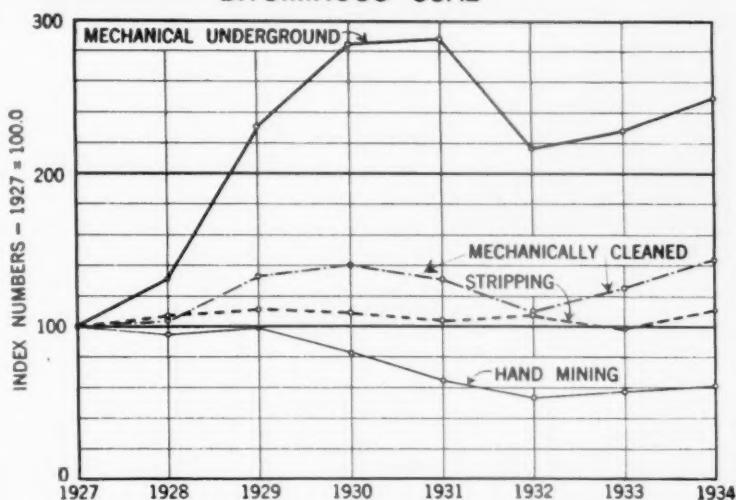


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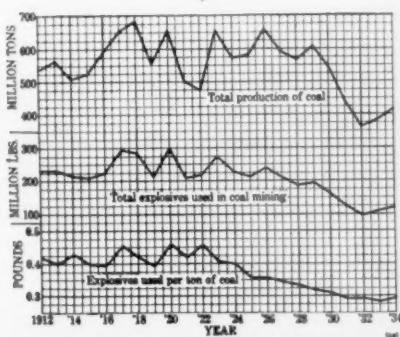
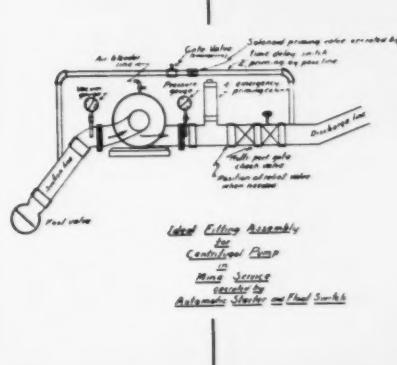
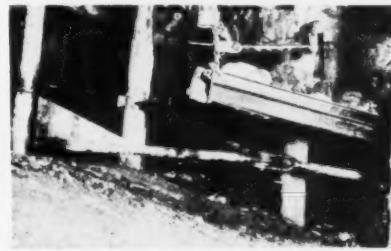
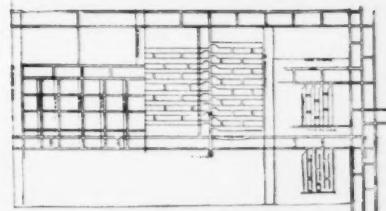
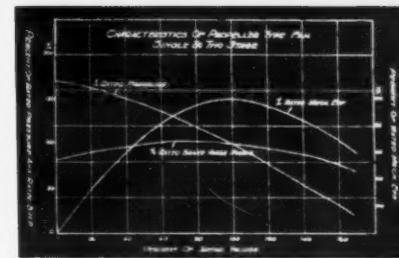


Figure 2.—Relation between explosives used and coal produced during 1912 to 1934 inclusive

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